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MOTOR BOATING

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EDITED BY CHARLES F. CHAPMAN

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PRECISION
BALL BEARINGS
(PATENTED)

With the high cost of labor and materials everywhere tending to encourage a neglect of those repairs and adjustments that in normal times would be a matter of course, quality in a machine and in its parts stands out in bold relief —serviceability takes on a new value— factors of safety cease to be mechanical abstractions and become big dollars-and-cents realities.

Today—cars, trucks and tractors are called upon for more service output with less attention input, than ever before. And those that are most successfully meeting this extreme test are—practically without exception—those having "NORMA" equipped ignition apparatus and lighting generators.

Be SURE. See that your Electrical Apparatus is "NORMA" Equipped

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COMFORT is the dominant characteristic of the 52-Foot Great Lakes Family Express Cruiser.

Comfort is a thing that every boat owner wants—and that Great Lakes Boat owners actually experience.

Comfort in this ideal boat, extends to the big and little things alike.

The lay-out of the boat—crew's quarters, galley, forward stateroom, engine room and bridge deck, owner's stateroom, after cockpit—is ideal from the standpoint of comfort.

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A completely equipt boat adds to the comfort of ownership. All Great Lakes Family Express Cruisers are delivered complete and ready to run, down to the last little intimate detail.

These are not accidental advantages; they are the definite results of deliberate and careful thought, of wide experience and of a real desire to build boats of distinction and quality.

GREAT LAKES BOAT BUILDING CORP'N
MILWAUKEE, WIS.
Designers and Builders of Boats of Distinction and Quality

52-Foot Great Lakes Family Express Cruiser.

Interior After Cabin 52-Foot Family Express Cruiser.

An illustrated brochure describing and illustrating this 52-Foot, 20 mile, Great Lakes Family Express Cruiser will gladly be mailed upon request.

Advertising Index will be found on page 140

MOTOR BOATING

Photographs by M. Rosenfeld

Be sure to scrape off all old scaly paint and putty up cracks before applying the paint

Giving Her the Once Over

Now Is the Time to Overhaul the Hull and Prepare the Boat for the Water—A Small Amount of Work, Carefully Planned in the Spring, Will Mean a Whole Season of Pleasure

By Harwood Koppel

GET busy on that boat of yours before the hot sun and winds open up the seams. Take the cover off and proceed to make an inventory of what will have to be done to her before she is fit for the season's commissioning. If you do this and prepare a list of the tools, materials, and supplies that you will need you will go about the work in the most efficient manner. It will save you time, trouble, worry, money—and profanity. Bear in mind the fact that when the weather reaches the motor boating season, you will much rather chug about in your craft than work on her and may be inclined to slight your job of giving her a thorough overhauling. It is better, therefore, to do it now, so that you will not have to take her out in the height of the season to do work that should have been done before you ever slipped her overboard this spring.

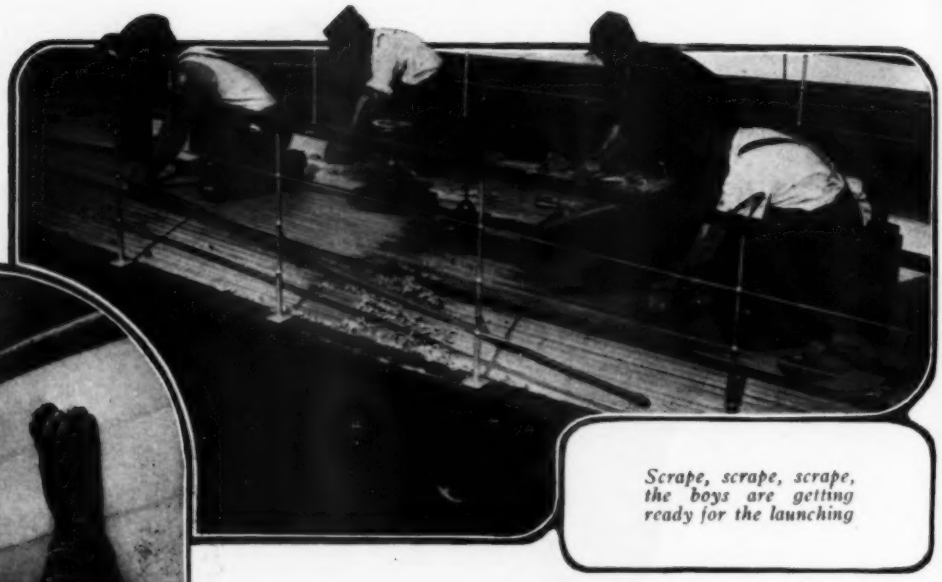
Efficiency in placing your boat in commission is just as important as efficiency in other lines of endeavor and from the experience of others we gain a certain amount of knowledge as to the best method of doing this work if it is to be a one-man job. If you are affluent and can simply have your secretary telephone the boat repair people and hang up the receiver, with, "and send me the bill," after giving elaborate instructions as to what you want done, then you need not bother reading this. But if you are the entire boatyard force, the gang, so to speak, this is written especially for your benefit.

It is only fair to warn you in advance that materials are higher this year than they were last and if you can do the work yourself that you paid someone else to do last year or the year before, that will be one way of meeting the increased cost of commissioning and you won't need experience if you follow these suggestions carefully, just enthusiasm, energy, and earnestness—and the exercise will do you good.

Divide your work into various sections, viz.: hull, deck, top sides, cabin interior, and bilges. Much painting will have to be done on all of these sections and, as after all, painting is really the important part of the work and the other work will be more or less in preparation for putting on the color, so—pass the paint pot, please, and let's get a start.

First we are going to provide the necessary implements so that we won't have to stop in the middle of a piece of work and run down to the marine supply shop or the hardware dealer a couple of blocks or miles away and ask him for something he hasn't got. That would mean waiting until we got down town the next day or perhaps in a couple of days and in the meantime the job remains undone.

Since we haven't just decided on the exact kinds of paints and the colors we desire we shall provide for the bilge, redlead or gray; white enamel and varnish for the inside of the cabin and perhaps other parts; varnish for the deck or perhaps buff or gray deck paint; gray for the locker interiors; varnish or deck paint for the floors; white, black or gray enamel or yacht white or black paint for the top-



Scrape, scrape, scrape, the boys are getting ready for the launching

It's a regular commodore who can and will put the flagship in commission himself

sides; bronze, green, red or brown copper paint for the bottom. For touching up metal work aluminum paint and a paint and varnish remover for removing paint and cleaning brushes while a paint softener will be necessary if you are going to put old brushes dried hard from the paint left in from last year into service. As you use the brushes this time from day to day, clean them out at the end of each day's labors with gasoline and they will be ready for use whenever desired. A painter's dust brush, some extra pails and a quantity of turpentine come under this category.

If new paint brushes are necessary get 1- and 2-inch varnish brushes, 2- and 3-inch paint brushes for the sides and a 3-inch paint brush for the bottom. Of sandpaper you will need much, and it would be better to get cork sandpaper blocks as they are superior to the wooden blocks. For rubbing varnish and enamel paints sizes No. 0 or No. 00, for rubbing bottom paints, No. ½ for sandpapering old paint and wood No. 1, and if the bottom is rough, No. 1½. Powdered pumice for cleaning and smoothing paint and varnish, and to cut the gloss between coats, and putty.

A good scrub brush, a water pail, several bars of laundry soap, a quantity of lye or washing powder, a ship scraper, a file for sharpening the scraper, a burnisher for turning the edge of the scraper, a gasoline blow torch, two steel cabinet scrapers, a 2-inch putty knife, and a pair of all enveloping overalls should not be forgotten.

The club secretary, too, when he is not attending to the recording business of the club, puts in his spare moments at overhauling

Having gathered together all of the machinery with which you are to undertake the overhauling the first thing to do is to decide on the proper method of mixing and applying the paint, after you have thoroughly cleaned the craft. The weather will play an important part in the results to be achieved and so, if it is a good dry day, work on the topsides, the deck, the hull or the bottom, and if it is rainy or threatening or even damp work on the interior or the bilges. It would really be better not to paint at all in damp weather or even in cold weather. Paint cannot take a proper grip on the wood in damp weather as the moisture penetrates both the paint and the wood and the paint may peel later. Should your boat be exposed to the elements try to do your painting early in the morning if the day is fair so that in the event that the showers which are so frequent at this time of the year materialize the paint will have had time to dry from the effects of the noon day heat. You must pick your weather with care for if the atmosphere is too warm the paint may form drops and if it is too cool it might shrivel up in drying. East winds are usually damp winds and so try to do your work with a north or northwest wind blowing.

Ready mixed paints not only save trouble but they are generally better mixed than you could blend them yourself and so I would recommend that sort. Take a clean (and be sure it is clean), paddle and stir thoroughly before using. Unless you do this the paint from the top part of your can will be thin and sickly looking and that from the bottom too thick to be easily and uniformly applied. Do not apply too thickly. That is a mistake that many amateur painters make. They seem to think that unless the color is spread heavily over the surface so that everything underneath is completely hidden while it is still wet, it will not answer the purpose.

Fresh paint should not be used on surfaces that are rough or surfaces that are damp, greasy or dirty. It may stick at first but eventually it will peel and the work will have to be done all over again.

Should the hull be in fair shape and it be unnecessary to remove all the paint already on, you have but to fill in the seams

with a good seam composition and other abrasions with white lead and putty to make a smooth surface and then after a good scrubbing set to. On the other hand, if it is going to be necessary to remove the old paint because it is cracked, scaly or too old or thick the best way to remove it is to put your gasoline torch into action, using seventy-four degree gasoline. Experienced painters take the torch in the left hand and their scrapers or putty knives in the right. Watch out for sudden gusts of wind so that your flame will not be diverted from the paint to the wood. If you are working on the hull, use your sandpaper generously after you have removed the paint and apply two coats of white lead and zinc before applying the final two coats if enamel is used, rubbing each coat except the last lightly with No. o sandpaper.

Now that you are ready to apply your color you must exercise care to get it on evenly and if you will paint across the planking for a space and then bring your brush along on the planking following the grain of the wood it should eliminate the marks of the brush that so often denote the amateur and make a smooth job. When you get to your enamel paint the job will be a bit more difficult for enamel is extremely thick and sticky and to the inexperienced seems to daub on, but enamel will leave no brush marks and makes a glossy surface. Beware of a heavy hand in your enamel and beware of a heavy hand in putting on glossy black paint, otherwise the job will be criss-crossed with seams of paint or ridges that spoil the even surface. Less than half a gallon of enamel will be required for the average small motor boat on her top sides, and you will find that it stretches amazingly without thinning.

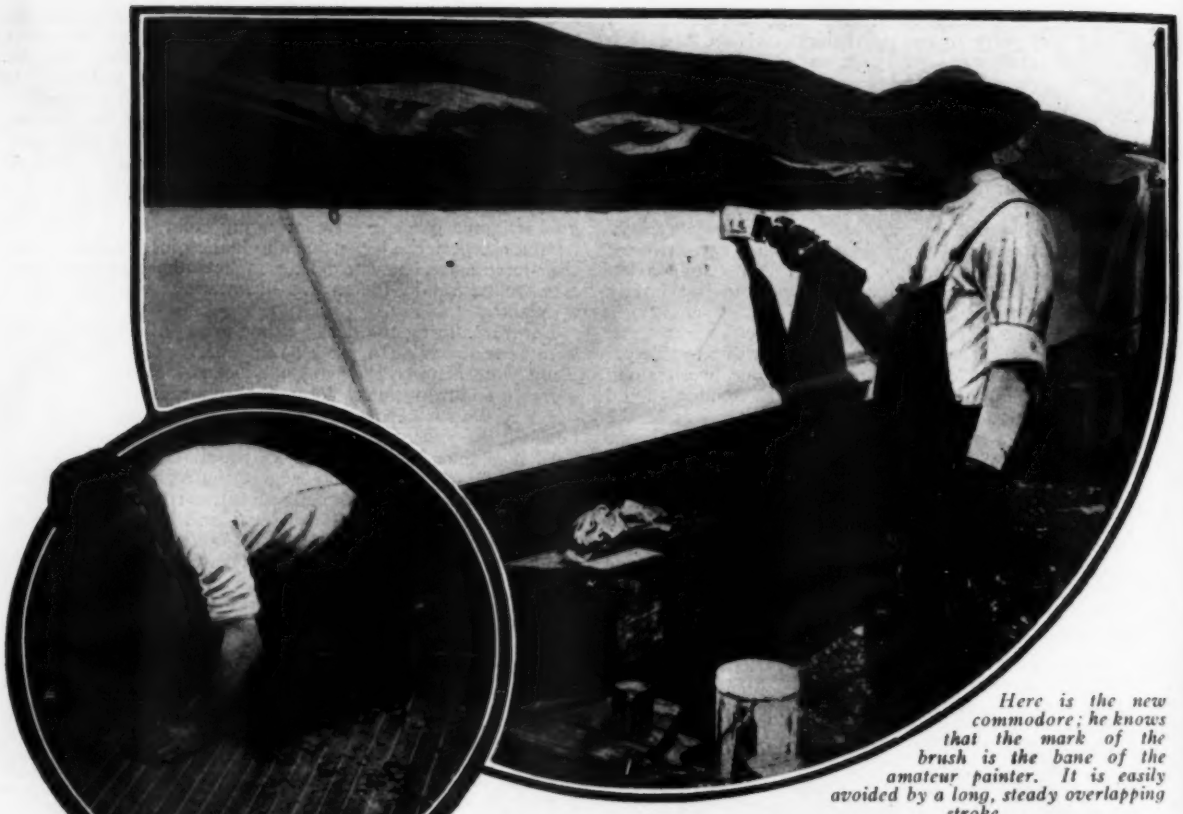
Striping with gold leaf is not nearly as difficult as is believed by those who have never attempted it, for you may buy the gold leaf in rolls. It can be had in almost any width and these rolls are arranged with the leaf placed on a backing of tissue. If you get a roll from one-quarter to one-half-inch wider than you desire it is comparatively easy to size it down with "oil gold size," of yellow color, and this should be put on sufficiently far ahead so that it will be dry from eighteen to twenty-four hours before the leaf is put on. You will find that this leaf will stand more and harder wear than the paint and it is unnecessary to put anything on top of it. This same gold leaf can be used on the ports and it will save keeping them polished. It may also be used to advantage in other places where brass ordinarily is used. Book gold would problably be better for this use.

You may find that white enamel paints will be cheaper in the end for they do not as a rule crack and they keep clean longer than ordinary paint and are more easily washed off. Some boatmen have been using a glossy black which is also a good color if it is properly trimmed with white, gold or some other good contrasting color, but one of the troubles experienced in using the black gloss paints is that they have a tendency to blister in hot climes because they absorb and retain the heat. Indentations too, also show up plainly.

Before painting the decks either scrape them thoroughly with a steel scraper or use a paint remover and then scrape. Keep your scraper sharp by all means, as a dull one requires an extraordinary amount of unnecessary labor. In order to keep it keen place it in a vise and file it until it is beveled like a planer. Next rub it briskly with an oil stone until it is smooth and shiny with the marks of the file and rubbed off and finally take a good burnisher of hardened steel and run it across the edge until you have turned over the feather edge. When you have finished scraping your decks sandpaper them with No. 1 and then with No. o sandpaper with the grain only. Place on your first coat of varnish and then dress it down with No. o sandpaper; allow it about five days to dry and then apply your second coat, again use the sandpaper and permit it the same length of time to dry; give it the third coat in the same manner and finally a fourth, but do not sandpaper the last one. Do not be surprised if your varnish does not last through the summer for it is rather unusual for it to do so without renewal. If the varnish is in good shape from last year wash it with pumice and water or a good washing powder, apply a coat of varnish, sandpaper it down and then give the decks a second coat, but again do not sandpaper the last coat. The use of

This is the club treasurer. He is as efficient in filling the deck seams as in watching the finances

Don't neglect to try out the motor before the overhauling is completed



Here is the new commodore; he knows that the mark of the brush is the bane of the amateur painter. It is easily avoided by a long, steady overlapping stroke

By scraping with the grain you avoid gobs and scratches

sandpaper or pumice on the first coat cuts the gloss and makes the second stick more firmly.

When you get ready to work in the cabins and other parts of the boat's "innards" it might be a good plan to first take out all movables, for this will not only save shifting them around but will avoid the possibility of their becoming splashed with paint and prevent them from absorbing the odor of the wet paint. Few boats will need to have their interiors renewed if care has been taken of them during the time they have not been in service and if the cabin has been done in enamel a good scouring may be all that will be needed. If it does need repainting soak a heavy rag or preferably a piece of waste in lukewarm water and then dip it in some powdered pumice and wash over the surface with that. This will remove the dirt and cut the gloss sufficiently for the new coat of enamel to hold fast Should your cabin need varnishing instead of enameling use same materials for washing the old varnish and apply as you would the enamel. In either case leave the doors and windows open as much as possible so that the enamel and varnish may dry, for it is not heat, contrary to general opinion, but air that dries paint quickly and effectively.

Before painting the bilge with red lead or a gray colored lead or zinc paint be sure it too is clean. Remove all possible pools of water and then scrape the bilge out thoroughly. Wash it down and if you find that the ordinary washing powders don't get results use gasoline which is splendid for removing oil and grease. If you can run a chain through the limber holes and work it back and forth it will prevent their becoming clogged. These limber holes want to be free so that water may run to the lowest part of the boat where the pump intake should be. If you have a bilge through which there is a constant circulation you can keep it odorless and sweet, if not you had better be sure to do a good job if you don't want to be troubled by smells later on.

If I may revert to brushes for a moment, since they play a most important part in the rebirth of the average motor boat after a winter of slothful rest, a few pointers on the right sort of brushes may not be amiss. Select the proper brush if it is necessary to buy one this year and get a good one so that you may have it not only all through this season but from year to year.

As a bit of original motor boat philosophy I might suggest that a long haired brush like a long haired woman is the most dependable and dependability is a prime requisite, while a short haired brush like a bob-haired woman is apt to be erratic and masquerading as something that it is not. Temperament in brushes is to be as carefully avoided as temperament in women. A brush tightly brass bound and thickly set will pay better in the end. Yet many boatmen of even comfortable circumstances invariably buy their brushes in the ten cent stores. The consequence is that before they have gotten very far on the job they find the bristles pulling out and attaching themselves to the woodwork of the boat with a tenacity that almost baffles prying them loose.

Brushes made of bristles known as Russia bristles of long gray and white hair will be found most satisfactory in the majority of cases, and when making your purchases beware of the black China bristles set in nickel ferrules. One way to properly test your brush before making your purchase is to stand the brush vertically on its handle and pour some water on the wooden head. This will swell the dry wood and tighten up the hairs, thus reducing shedding to the minimum.

Between coats of paint on your boat keep the brushes soaking in oil or leave it in the paint pot where it will soak in the paint itself and when you have finally finished wash out all of the fresh paint in kerosene or turpentine, shaking the brush dry; a long sweeping, swinging motion of your arm will accomplish this in no time.

What more inspiring sport can one imagine than these two scenes bring home—one with your fast runabout dashing hither and thither among an endless variety of islands and through channels and narrow passages almost countless in number, and the other in one's cruiser out at sea, many miles from the mainland, where perhaps you are the first white man to explore

The Great Appeal of Motor Boating

A Clean and Health Promoting Recreation with Plenty of Variety, Pep, and Tang—A Sport That May Be Enjoyed on River, Lake or Sea, in Many Kinds of Craft—Inexpensive or Luxurious as You Please—All This and More Is Found in Motor Boating.

By Stillman Taylor

THE call of the sunlit water and the appeal of the motor boat are two reasons which clearly explain why the sport of motor boating is today one of our finest and most important recreations. As there is born in most men and many women an innate love of the great out-of-doors, the recreational side of this wholesome sport of boating is popular among a very large and varied number of outdoor loving people, Motor boating is by no means a sport for the few but a recreation that may be enjoyed by all. Like shooting and fishing it is participated in the world over and its rapid development and steady growth as a recreation has won for it a high place as an international pastime.

I have been a boatman all my life and have liked boats ever since I was old enough to look over the gunwale of a skiff. But it is not merely my own ideas I would set down but the opinions of many others who have found health and pleasure on the water. And I can think of no better illustration to show why motor boating is a splendid sport for you and for me than to write down a fragment of the conversation of a few motor boatmen whom I chanced to meet last summer.

It occurred at an informal old-fashioned New England picnic. The affair was born overnight in the brain of a sociable member of the summer colony who conceived the idea of inviting all owners of motor boats on our beach to join in a clambake at Rockland Isle—a small picturesque island about six miles west of the beach and lying two miles off shore. Twelve motor boats made the trip and after lunch the conversation of the group of which I chanced to be one, veered about until it settled down to an animated discussion of boats and the sport of boating. Sensing a possible story I mentioned that motor cruising was my pet hobby and magazine making my particular line. Introductions showed that a doctor, lawyer, factory superintendent and a clerk formed our little group.

"Cruising happens to be my favorite sport also," volunteered my doctor friend. "I have been devoted to it ever since I left college and put out my shingle—the first couple of years in a knockabout. As my practice grew I sailed a cabin sloop, then a 40-foot yawl and four years ago I bought my first motor boat, the same cruiser I now own. I thought sailing the finest sport but as my time for pleasure has long been limited by a large practice, I selected the surer and quicker traveling motor craft. I still believe sailing is a good sport, but even if I had more time I would not be again satisfied with a sail-driven boat. Perhaps I might select an auxiliary but I very much doubt it. My 45-foot motor cruiser is a one-man boat, easier to handle, just as staunch and seaworthy and a great deal more dependable than a sailing craft. Depending upon the wind I was often becalmed and never sure about reaching the home anchorage within three or four hours of the time I was due. Now I can weigh anchor whenever I please, regardless of wind, weather or tides, and tie up at my mooring on time. I am a busy specialist and must take my recreation in small doses, so I slip away now and then for a brief outing, have a little fishing, enjoy the quiet and dustless day off, independent of hotels with all the comforts I need within reach, and return promptly on time to visit my patients, as fresh as a daisy."

"A good argument, Doctor," commented the lawyer, "and

I am willing to concede the point you make. Motor cruising is a good sport but you are a born sailor and I am not. Law is my business and my hobby. I have a one-track mind. I like outdoor sport only for its tonic effect—to keep the body and brain fit and clear for my professional activities. Like you I have a large clientele and can only spare an occasional brief day or two for recreation. During the winter months I am busy in court and lecturing but throughout the summer I spend every other week here at the shore and enjoy a little fresh air in my motor runabout. For my requirements the trim craft in which I brought my family here is particularly well suited. It has proven one of the best investments I have ever made. For a man who is neither a sailor nor a mechanic and does not care to spend much time in looking after his boat, the 35-foot runabout appeals to me as the logical choice. Before I purchased it, I regarded the sport of motor boating as synonymous with grime and grease but my boat is easily kept as clean as a whistle. The hull is well designed to give good speed without sacrificing comfortable seating room and is well constructed to withstand rougher water than I have yet been out in. The motor is placed forward in its own compartment and is as clean and easy to handle as the one in my automobile. Steering wheel, spark, and throttle levers and gauges are mounted on the bulkhead in front of my steering seat, and I can start my motor by simply pressing the button of the electrically operated self-starting device. The craft I own is a stock model, with a quiet running motor of 60 h.p. and I consider it very economical to run—cheaper in fact than a car of the same power. When I come from the hot and dusty office I feel like a new man after a dip in the ocean and a five- or six-mile spin around the bay."

"Speed is my hobby. I prefer plenty of action in my sport," said the banker. "I can find speed in many recreations but I like to feel cool and comfortable after business hours. I have never been what you would call a sportsman. I do a little fishing occasionally but very seldom handle a gun. Sport appeals to me only for its beneficial effects in restoring the balance and to efface the anxiety and close attention of the banking house. On week-ends and during vacations I like nothing better than to sit at the wheel of my high-powered racing boat. I have competed in many races and have won several cups but it is not the excitement of competition that attracts me most, but the sheer joy of skimming through the water at 50 miles an hour. My partner owns a steam yacht but I would not exchange my motor flyabout for his boat. The motor is quiet and powerful and is easily handled and for providing exhilarating sport without noise or dust and uncrowded wherever you may wish to go, I have found the fast motor boat to afford me the most healthful pleasure."

"My education and life work has been devoted to technical and mechanical problems," said the superintendent. "I am the directing head of a textile company which uses 4,000 machines and employs 7,000 hands. I am not an engineer, but I like to handle machinery, and I regard the modern marine motor as a highly efficient machine. I use a motor car a great deal to cover the distance between our detached mills, but I do not care for automobiling as a recreation. For a sport which combines all the advantages of a change from my work with the quiet restfulness of something to do in the fresh air, motor boating measures up to my needs better than all other sports. I have owned several boats. The first was an auxiliary sloop, but it was too slow under sail and power to satisfy me. I have two boys and bought a motor dory for their use three years ago, and I had so much pleasure in sharing this craft with them that last year I bought a 35-foot runabout for myself and the rest of the family. I am not a sailor, nor am I an enthusiast, but I prefer motor boating to the exclusion of other sports. It is mechanically propelled, possesses sufficient speed to visit interesting places along the coast and return the same night, and in proportion to the pleasure and health it has given all of us, I consider a boat of this kind in the light of a wise investment rather than as an expense. If I had more time I might own a comfortable cruiser, but as I am situated, the 35-footer with a six-cylinder motor fully satisfies me."

"My work is highly systematized and demands close attention to details. My hours are long and I consider outdoor recreation as necessary as the food I eat," said the clerk. "I am fond of motor boating as a sport and combining it with fishing, it gives me the things I most enjoy.

The modern runabout of today will comfortably seat six persons and a speed of 30 miles an hour is just jogging along. Yet there are no traffic laws to spoil one's fun, no cities or corners to slow up for, no dust or bad roads, just go where you will, as you will

How could you ever get here or even view this great natural wonder except by means of a motor boat. Note the size of the craft in the illustration and you will wonder more

They are all coming to it. You have heard of those dyed-in-the-wool windjammers, who a few years ago would not set foot aboard a motor craft. It's different nowadays, and why shouldn't it be? How many years off your life would you have given to be aboard one of these boats?

For those who prefer cross-country sailing or we might ca'l it cruiser touring, the thousands of mi'es of canals offer endless variety

Photograph by Underwood & Underwood

For several years I have spent my three weeks' vacation here at the shore and, living but 70 miles up the river, I come in my motor boat to join my family. During the remainder of the year, from May to October, the boat is used Sundays and holidays on the large river of my home town. I have several children and the boat which serves us best is a 25-foot open runabout of good beam and of moderate power, giving a speed of 12 miles an hour. With the help of my fifteen-year-old boy I overhaul the motor, paint the hull and launch the craft each year and carefully store it well protected for the winter. This is the sixth year I have used it and with the exception of a few minor repairs and replacements of small parts which I attend to myself, I have had no trouble or expense outside of the ordinary upkeep.

My boat gives the family many pleasant little trips—a run up or down the river with lunch on some attractive island or on some shelving beach on the shore, and I take the boy along on my fishing trips to places not easily reached by road. The motor boat has given me so much pleasure by keeping us all happy and well that I will always own a boat while living within reach of the water."

While we were chatting, seated on a little knoll overlooking the pebbly shore of the island, we were watching two small dark spots out at sea gradually unfold and resolve into two boats. As the crafts neared the island we recognized Capt. Jerry Jones with a stranger in tow. It proved to be a power canoe. The skipper had run out of gasoline and the always extended helping hand of Capt. Jerry had reached out to bring him into port. Now Capt. Jerry is as well known as the Post Office of the little resort town we called our home port. We invited the late comers to join us with a wee nip of cheer and cigars and then asked their contribution to our opinions on the sport of motor boating. We knew what Cap. would say, but as he always has a characteristic manner of expressing his opinions on all subjects, everyone who has ever met this old seadog is always glad to listen to what he has to say. But Cap. allowed he would waive his turn until the last.

"Turn to Mate," he urged the stranger he had brought to our gates, "fer there's no tellin' when I be stoppin' whin once I gets yarnin' 'bout boats, which is me eat and drink and me pleasure for forty year. Turn to Mate an' I'll be there for the cooming watch."

"Canoeing and camping are my favorite sports. I am a plumber by trade and live close by the mouth of the river which flows into the sea ten miles to the eastward. I have owned several canoes and for three years sailed a fast racing canoe. As one member after another of our small boat club bought a motor, I finally installed one in a 17-foot paddling canoe which I picked up second-hand. The motor was of the portable type and gave me so much satisfaction that I sold my sailing canoe and decided to own a canoe built especially for power. The canoe there on the beach

(*Continued on page* 94)

Engineering Up the Engine

Sympathetic Suggestions on Making the Motor Mote in Symphony—A Day's Repairs in Time—Saves Nine Later

AFTER a winter of rustication and rust the time has now arrived when all good boatmen should come not to the aid of the party, but to give first aid to dormant motors, and so transform them into restless, chugging engines, tugging at their anchor chains in anticipation of the time when they will get underway for the season's work. This year particularly, will doubtless witness more work being done on motors than in many seasons past. There are several reasons for this. The war had not only pretty well tied up the available boats owing to the Navy Department taking over the craft and various governmental restrictions but the men themselves were tied up. Thousands of ardent motor boatmen were in the service and they were busy making repairs on Uncle Sam's craft and not their own. They knew that they woud not be able to use their own boats, in those instances where they still retained their vessels and in other instances they were not stationed near home where they could do any overhauling.

Many craft have gone, therefore, two seasons or more without overhauling and it behooves the man who desires to make the most of the opportunities afforded by the removal of all restrictions to place his boat in the best possible shape at the earliest moment. Again, this year more than ever it is going to be necessary for the owners to do their own work. In the first place, so many craft are to be overhauled that the repair men are already reporting that they cannot take care of all the work that is being offered. A number have announced that unless they can secure further skilled mechanics they will be seriously handicapped. Those who have been selling some particular motor are planning to do repair work only on the motors they have sold, or at least on those motors of the make they are handling. Thus, it will be seen that self-reliance will play a large part in putting the motor in trim for the 1919 season. There has always been the usual number of owners who prefer doing their own work anyway, taking keen pride in doing a good mechanical job and great pleasure in just fussing around an engine, but some there are who were willing to let the other fellow do it, even though the other fellow had to be paid. The increased cost of materials and the higher wages paid mechanics this year would add materially to the cost of overhauling and for those enthusiasts who desire to save a bit the suggestions embodied in this article should prove timely and profitable.

Stripping the engine of the parts easily removable and particularly those which will give access to other "vulnerable" parts is the first step. As these parts are removed they should be given a gasoline or kerosene bath and nothing should be slighted. The parts that can well stand the bath and benefit by it might include everything from the carbureter to the bolts and nuts. Along with the carbureter should be removed the magneto, lubricator, spark and throttle controls, water and fuel pipes and connections, exhaust pipe connections and all lubricating pipes cleaned.

If you partly fill each cylinder with kerosene and let it stand for five or six days it will loosen the gummed oil from the sides of the cylinders and make easy the removal of the piston rings. The kerosene will trickle its way into the crankcase and this should be drained out. Hand holes in the crankcase will simplify this by giving you a chance to dry out the crankcase with a rag, but if there are no hand holes open the drain and draw out all of the oil, be it just kerosene or a mixture of kerosene and gasoline. Turn the flywheel over a bit and it will be found that this will help materially in loosening things up.

To remove the cylinders unscrew the holding down bolts and if, as in most marine motors they are cast singly or in pairs, they can then be lifted from their pistons. Care should be exercised to lift them vertically and at the lowest part of their travel which will protect the connecting rods from straining and bending. If the connecting rods were uncoupled instead of taking the cylinders from the pistons, the weight of the parts removed would be considerable and in boats with large engines might require more than one man to do the work.

Photographs by M. Rosenfeld

Gasoline is excellent for removing grease, grime, and carbon

Care to replace parts in exactly the same positions they were in when removed is quite essential

Before proceeding further it might not be amiss to remind you to mark the parts removed so that they may not become mixed. A small, sharp center punch will be found admirable and the forward side would be the best place to mark them as it will then be easy to remember just how they should be placed and may save inverting. This is important on the pistons so that they may be assembled in their respective cylinders.

With the cylinders out of the way it is advisable to proceed in an orderly manner and begin work on the pistons. To remove them simply uncouple at the crank or big ends. Are your piston rings fitting snugly enough to prevent gas getting through? That is an important question and an examination to determine this should be made very carefully. Blow marks, of black sooty streaks, will show across the face of the rings if there is a leak and the worn rings should be replaced. If the rings are in good shape they will be smooth and bright. Where new rings are to be used it should be borne in mind that there should be sufficient clearance at the ends to prevent possible friction and seizing within the cylinder; in short they should fit neither too loosely nor too tightly. Try the rings in the cylinder before putting them in the piston. Ground rings should be open about the space of two sheets of paper between the ends while turned rings should be only half of that size. A help in removing the piston rings will be four fine strips of the blade of a hacksaw or perhaps even tin. This will lift one end of the ring and enable you to slip the other pieces around. Be sure to keep one piece under the end that is lifted until you have the ring quite out of the slot.

A smile will supplement your tool kit to an extent generally unappreciated

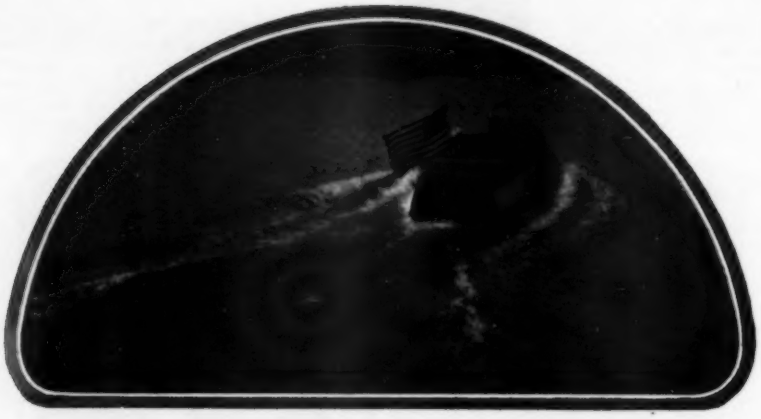
It might be advisable to devote your attention next to the gudgeon or crankpin for if the anchoring screw has worked loose the pin may get adrift. If your engine is one of the type in which no set screw device for preventing the crankpin from working out has been provided by the manufacturer the pin should fit snugly in the bosses and if use loosens it up a new pin is needed. As there is more pressing in a two-cycle motor than in the four-cycle engines the pins need not be so snug in the former. By snugness it is not meant absolute grinding but a space of the thickness of a sheet of paper will give them a chance to expand when heated. Due to the force of the explosion of the engine upon the crankpin there may be a ridge on either end and on the inside next to the piston bosses. The bushing, too, may be worn somewhat and in making the examination for wear look carefully at the part that fits the bushing of the connecting rod end. One way of ascertaining the wear on the crank rod is to try it in the bushing and if it sags more than one-sixty-fourth of an inch, by all means get a new bushing.

Scraping is the best manner if the brasses are deeply scored but where the bearing surfaces are kept well oiled and clean it will not be found necessary to scrape. One way of trying the left fit of the brasses is to tighten up the bolts. If there is too much play in the connecting-rod bearings remove the bolts which secure the parts and from the flat surface of the brass and cap file a bit of the metal.

Should the engine be knocking and you find that there is too much end play in the main or crankshaft bearings take up the wear. Shims, as they are known, are provided in a great many engines between the bearings where they are inserted. If the bearings are to be tightened up it may be advisable to remove one or more of these

(*Continued on page* 100)

In removing or replacing heavy parts it is well to remember that brute strength is not as important as attention to detail



An Ideal Runabout for Cuba or Anywhere

A Boat Built from the Plans of Hike You Which Appeared in the April, 1918, Issue of MoToR BoatinG

USING the plans of Hike You, the third design of My Ideal Runabouts published in the April, 1918, issue of MoToR BoatinG, John E. Cendoya, of Cuba, has constructed Bebe and made of her an ideal craft for almost any waters.

Native woods were used in the construction. The frames were cut from a native wood called majagua, green in color and something between oak and mahogany in its makeup or fibre. The planking is of native cedar, the transom and keel of Cuban mahogany, the stem of majagua, the deck of alternate strips of mahogany and oak, all trim mahogany Valsparred. The boat was built by native carpenters.

The power plant consists of a 25 h.p. Sterling motor. Except that it was necessary to raise the deck a little in order to get the Sterling engine under, as it wouldn't fit under the deck of Hike You, the plans are identical.

Below: In the twilight of a tropical evening Bebe comes putting home. Her Sterling 25 h.p. motor brings her back every time

John E. Cendoya and his son John E. E. Jr., are speeding along in Bebe in the waters around eastern Cuba

TABLE OF OFFSETS

STATION	HALF BREADTHS								HEIGHTS ABOVE BASE							DIAGONALS		STATION
	SHEAR	CHINE	12" WL	LWL	22" WL	26" WL	34" WL	KEEL	CHINE	SHEAR	12" WL	22" WL	26" WL	34" WL	No 1	No 2	
0	1-7.5	2-1.0		2-0.7	2-0.0	1-10.1		1-1.4	1-2.1	2-0.0	2-0.0	1-1.7	1-0.1	1-2.1	0-8.7	1-5.5	0
1	1-11.4	2-2.4		2-2.3	2-1.7	1-11.0		1-0.2	1-1.6	2-2.2	2-0.5	1-1.0	1-1.4	1-1.8	0-11.0	1-6.3	1
2	2-1.2	2-3.6	0-5.5	2-3.4	2-2.3	2-1.1		0-11.0	1-1.5	2-0.5	1-5.2	1-0.1	1-0.7	1-1.3	0-11.0	1-7.2	2
3	2-4.8	2-4.4	0-10.6	2-4.4	2-2.3	2-1.2	2-1.2	0-9.7	1-1.2	2-1.3	1-3.1	0-11.3	1-0.3	1-1.0	1-0.0	1-7.7	3
4	2-5.4	2-4.3	1-1.3	2-4.4	2-2.5	2-1.6	2-1.2	0-8.7	1-1.2	2-0.7	1-3.4	0-10.6	1-0.1	1-0.6	0-11.3	1-8.7	4
4½	2-5.7	2-4.2	1-2.1					0-8.4	1-1.1			0-10.4	1-0.1	1-0.6	1-0.7	1-8.3	4½
5	2-6.0	2-3.5	1-1.7	2-3.5	2-1.6	2-1.3	2-1.3	0-8.0	1-1.4	2-1.0	1-3.7	0-10.4	1-0.1	1-0.7	1-1.0	1-8.3	5
5½	2-6.0	2-2.7	1-1.4					0-7.6	1-1.5			0-10.4	1-0.4	1-1.0	1-1.1	1-8.3	5½
6	2-5.6	2-1.6	1-0.5	2-1.7	2-2.1	2-2.6	2-1.3	0-7.4	1-1.7	2-1.6	1-5.6	0-10.5	1-0.3	1-1.3	1-1.1	1-8.1	6
6½	2-3.1	2-0.7	0-11.4					0-7.3	1-2.0			0-10.6	1-0.5	1-1.6	1-1.1	1-7.7	6½
7	2-4.0	1-10.3	0-10.0	1-10.3	1-11.0	1-11.6	2-1.5	0-7.2	1-2.6	2-2.5	1-6.5	0-11.1	1-1.1	1-2.4	1-1.0	1-7.4	7
8	1-11.6	1-9.1	0-6.5	1-9.7	1-9.6	1-9.6	1-8.5	0-7.5	1-4.1	2-3.0	1-5.6	1-0.3	1-3.1	2-10.7	1-0.3	1-5.6	8
9	1-3.5	0-4.6	0-3.0	0-7.2	0-10.2	0-11.1	1-0.6	0-8.3	1-6.0	2-3.4	2-3.4	1-3.7	3-1.0		0-10.3	1-2.0	9
10	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2		1-6.3	2-3.4	2-3.4	0					10

ALL DIMENSIONS GIVEN IN FEET, INCHES AND EIGHTS TO OUTSIDE OF PLANKING

Table of offsets from which the boat illustrated on this page was built

A Mark Boat That Will Mark

How to Build a 10-Foot Scow-Type Boat Which Can Be Used for Many Purposes

By Frederick K. Lord
Official Measurer, A.P.B.A.

MOTOR boat races are run on a course which has previously been laid out by the regatta or race committee and which is provided with certain marks to show the direction of the course. Often well known objects such as Government buoys, lights, etc., are used but it more often happens that such objects are not available or that they are not conveniently spaced. It then becomes necessary for the race committee to place other objects on the course—they are generally placed only at the spots where the course changes direction. These objects, or marks, as they are properly called, have been a source of trouble to race committees and contestants and have spoiled many a race, through being improperly designed for their purpose.

There are several reasons for this, the chief one being that the average race committee has had no experience in the design and construction of marks. A good many seem to think that almost any old thing that can float and carry a flag will do. They may be a little shy of money and some one will suggest a cheap and easily constructed mark, and it is used, generally with unsatisfactory results. The inexpensive and simple type of mark is a delusion. Such a mark lasts about a season, whereas a real good mark may cost more but will last twenty years with proper care and be far cheaper and infinitely more satisfactory in the end.

A really successful and satisfactory mark must have many qualifications, not apparent to any one who has not had experience with them. It should be of a form and color that is plainly visible against any background. It should be able to stand upright and not lay over in a wind. It should be non-capsizable, non-sinkable, steady on its position, and not drag its anchor, strong enough to stand bumping, and be of such a shape that it can be towed fast and safely to its position.

Many a race has had to be postponed due to the marks being of such construction that it took hours to tow them out and set them. When the race is over everybody runs for home, and the marks are often left out until the next day. A high wind blows during the night and the next day they are gone.

The mark is composed of two parts, first, the mark itself which is the distinguishing object for the course and record, and the structure for floating and sustaining it in position.

Referring to the latter there are several forms commonly used, such as spar buoys, barrels, kegs, raft structures, and various combinations.

All have some bad features. The spar is objectionable because it will not stand up in a breeze or tide-way and is clumsy to place and handle. The same may be said of the combination barrel and spar-type. The drag of the mooring rope and wind cause them to keel over until they are too close to the surface of the water to be visible at any distance. Attempts have been made to overcome this by using two or three small barrels or kegs, but while these stand up better they very often capsize in a stiff breeze or rough water and they often do not have enough reserve flotation to sustain the downward thrust on the barrel; due to excessive wind pressure combined with the tripping tendency caused by the pull on the mooring line. A mark of this type can be made but it would have to be quite large to be perfectly seaworthy. Its weight is prohibitive as this type is almost impossible to tow and it must be taken out in a boat. This type also is a heavy drag, especially in a strong tide, and requires a heaving mooring and plenty of scope. Barrels are liable to leak and sink.

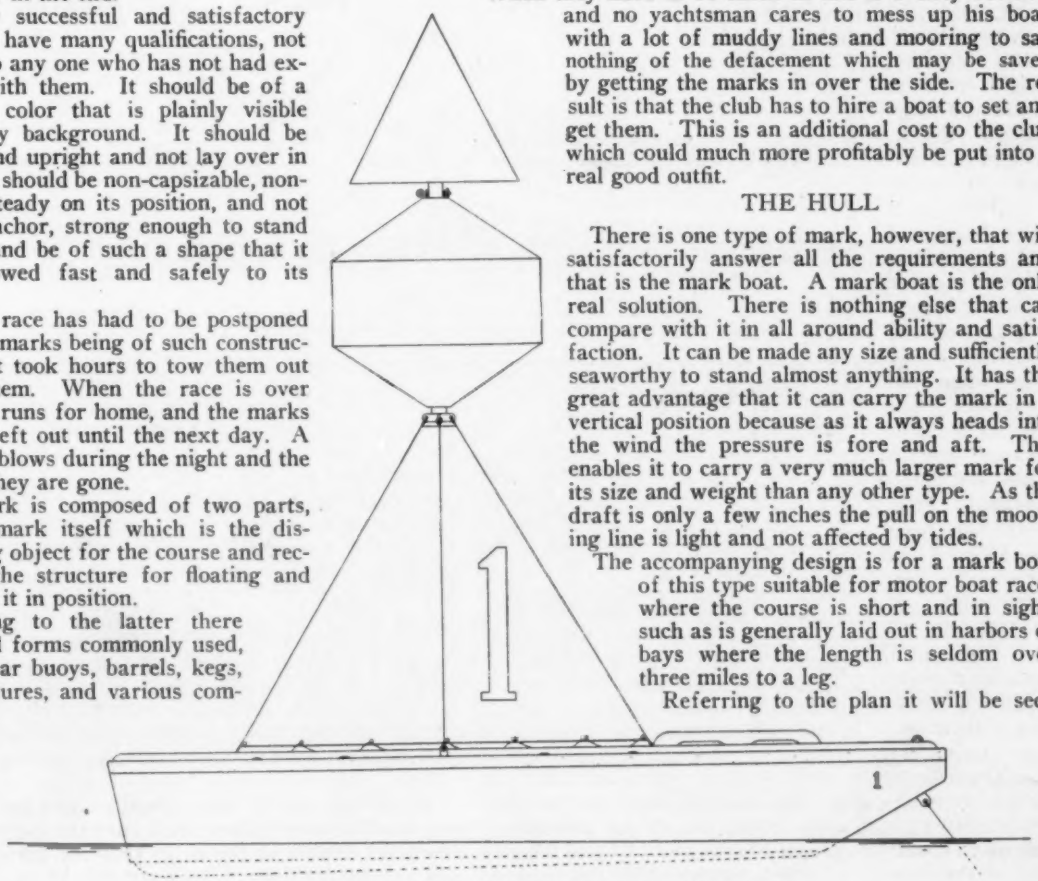
Other types usually consist of cross beams with tripods on top. These are the worst of all as they have practically no reserve buoyancy and the least side strain sends them over. All of the above types are practically impossible to tow and have to be handled from a boat. When they have to be taken in this is a dirty business and no yachtsman cares to mess up his boat with a lot of muddy lines and mooring to say nothing of the defacement which may be saved by getting the marks in over the side. The result is that the club has to hire a boat to set and get them. This is an additional cost to the club which could much more profitably be put into a real good outfit.

THE HULL

There is one type of mark, however, that will satisfactorily answer all the requirements and that is the mark boat. A mark boat is the only real solution. There is nothing else that can compare with it in all around ability and satisfaction. It can be made any size and sufficiently seaworthy to stand almost anything. It has the great advantage that it can carry the mark in a vertical position because as it always heads into the wind the pressure is fore and aft. This enables it to carry a very much larger mark for its size and weight than any other type. As the draft is only a few inches the pull on the mooring line is light and not affected by tides.

The accompanying design is for a mark boat of this type suitable for motor boat races where the course is short and in sight, such as is generally laid out in harbors or bays where the length is seldom over three miles to a leg.

Referring to the plan it will be seen



General outboard view of the mark boat. Scale: ½ inch = 1 foot

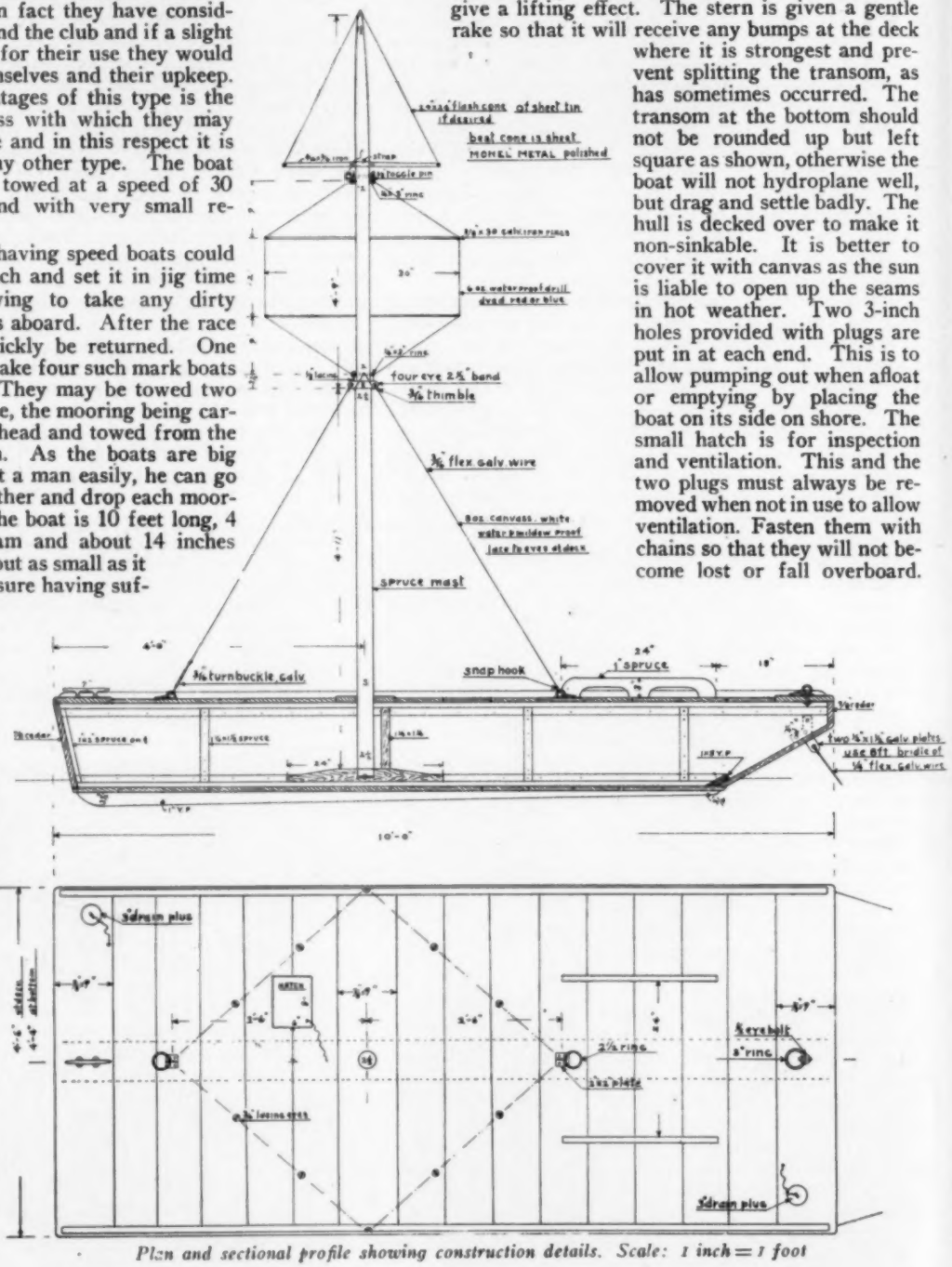
that the boat is practically a decked over scow. This type is best as it is stable, steady, sturdy, and cheap to build and will last for many years. It can be left in the water or drawn up on the beach or upon a float. The marks can easily be removed and stowed away from the weather. The boats can also be used for bathing platforms, and may even be used to support a light float and will be very handy to stand on end when washing down or painting the topsides of a boat, also to carry dunnage back and forth, or for setting moorings. In fact they have considerable utility around the club and if a slight charge was made for their use they would soon pay for themselves and their upkeep. One of the advantages of this type is the ease and quickness with which they may be set on a course and in this respect it is far superior to any other type. The boat being flat can be towed at a speed of 30 miles an hour and with very small resistance.

Club members having speed boats could take one mark each and set it in jig time and without having to take any dirty moorings or ropes aboard. After the race they could as quickly be returned. One boat could easily take four such mark boats in tow at once. They may be towed two abreast or in a line, the mooring being carried by the boat ahead and towed from the cleat at the stern. As the boats are big enough to support a man easily, he can go from one to the other and drop each mooring off easily. The boat is 10 feet long, 4 feet 6 inches beam and about 14 inches draft. This is about as small as it can be and yet insure having sufficient stability, weight, and size to carry a large enough mark. Weight is necessary to assist stability on a given beam and also still further provide against capsizing in case a gust should keel the boat over when the wind will get a grip on the bottom and exert a heavy additional pressure. This boat has been designed to withstand a 60-mile wind applied directly on her side and probably it could stand a 70-mile gust without going over. It would be difficult for this to happen as the boat always heads into the wind and therefore a side wind pressure is almost impossible.

It may be well to call attention to the why and wherefore of the details. It will be noticed that the mast is stepped aft of the center and that the hull has slightly more draft at the stern. This is to make the boat lie to her mooring better and steadier. A downward pull of a mooring line depresses the bow slightly and raises the stern making the boat slew around at anchor, therefore the draft aft must be increased to correct this condition.

The side cleats are deeper aft to still further help and are also necessary for steadiness when towing and also to protect the bottom when hauling out.

The bow is cut away for towing and to allow the seas to pass under easily and at the same time give a lifting effect. The stern is given a gentle rake so that it will receive any bumps at the deck where it is strongest and prevent splitting the transom, as has sometimes occurred. The transom at the bottom should not be rounded up but left square as shown, otherwise the boat will not hydroplane well, but drag and settle badly. The hull is decked over to make it non-sinkable. It is better to cover it with canvas as the sun is liable to open up the seams in hot weather. Two 3-inch holes provided with plugs are put in at each end. This is to allow pumping out when afloat or emptying by placing the boat on its side on shore. The small hatch is for inspection and ventilation. This and the two plugs must always be removed when not in use to allow ventilation. Fasten them with chains so that they will not become lost or fall overboard.



Plan and sectional profile showing construction details. Scale: 1 inch = 1 foot

The bottom and deck are about as light as they can be and stand up well. They must have the battens running down the middle as shown to keep the planks lined up and prevent leaking. Cleats are run along the deck at the gunwale. This is to give something to grab hold of

when handling the boat alongside and also to prevent anyone from slipping off on deck. The two cleats forward are for keeping the mooring and rope on deck when the boat is being towed. A small line should be carried on each boat for towing and handling.

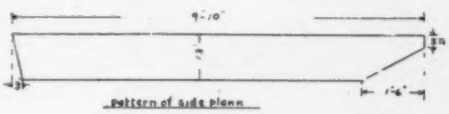
A 3-inch ring bolt is installed forward to assist in towing and there is a cleat at the stern. Two other ring bolts are provided amidships to tie fender ropes to when towing abreast.

The boat should be moored on an 8-foot flexible wire bridle as she will lie at her mooring steadier and is less liable to foul the line. The wire being thin offers less resistance to a strong tide and depresses the bow less.

When towing at high speed the bridle with a short line should be used to prevent yawing. The bridle is fastened to the bow with two ½-inch galvanized iron straps securely riveted. They should be bent inboard until they lead fair on the bridle. This also prevents them from digging into any boat they might happen to run against.

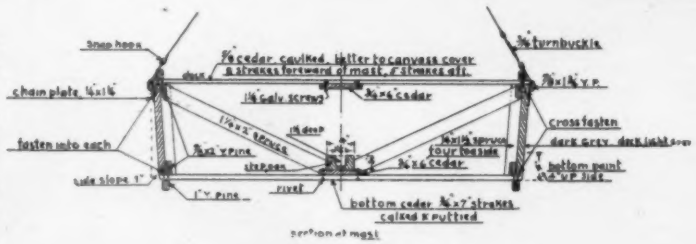
Chafing strips are provided at the gunwale to protect the hull. The sides have a slight flare so in case the hull should roll against a boat or float when handling, the blow will still land on the chafing strip, otherwise the side plank might be badly split. The mast is of spruce and several inches shorter than the boat so that it may be taken down and lashed on deck without sticking out over the ends when it might be liable to jam against another boat in handling.

The handling feature has been given attention because club members are often asked to help set the marks when the club cannot afford to pay to have it done, and those who have handled them well know what a rotten sloppy job it is to set the average style of mark.



THE MARKS

The average distinguishing marks are generally very unsatisfactory affairs, being faulty in size, shape, and color. It is a very common error to make marks too small to be easily seen. A mark seems very large when close up and only experienced boatmen realize how small they appear at any distance.



Construction details of mark boat hull

Shape is most important. Flags are unsuitable as they may fly end on to the course or else fail to stand out in gentle airs, especially if wet. Cross boards and flat surfaces are difficult to see and topheavy for the amount of their surface. A mark should be composed of two shapes, neither of which are like any other shape that is used in marine practice. It often happens when racing that other objects afloat or ashore will resemble a mark in outline or else the mark itself will be obliterated by a background, especially such as houses. Nearly all marine and land structures are composed of vertical and horizontal lines. Therefore, the obvious thing to do is to use lines which are not vertical or horizontal in order that the difference will be noticeable. The two best shapes for this purpose are the pyramid and the sphere. Viewed from any angle they will always appear triangular and round respectively. Experience has taught that a triangular base surmounted by a ball is a very efficient type of mark and a combination which shows up well, especially the triangle as the lower parts of most marks are hard to distinguish if the upper part is not readily seen.

The triangle, or pyramid, shown in the accompanying sketch, is of white water- and mildew-proof 8-ounce canvas slipped over the mast and laced to eyebolts in the deck. It is spread to form with four stays. These stays have a hook on one end and a turnbuckle on the other so that they may be quickly removed and the mast unstepped.

The ball does not have to be exactly round as the distance softens the outline. A simple and cheap method of making an approximate one is as shown. The one-quarter-inch by 3-inch diameter galvanized iron rings are at the top and bottom of the ball and it is made to stand out with two other rings placed as shown and 30 inches in diameter. The ball itself is of 6-ounce waterproof canvas-drill, dyed to color.

This ball is handy because it collapses and stows flat when not in use. To mount it slip it over the mast where it is secured at the top by a toggle pin which is thrust through an iron eye fastened to the ring and then through the mast, when the toggle drops down and prevents the pin from working out. The lower ring is then laced down to the mast band which supports the stays to the deck. It is better to lace it down because if the ball should shrink from becoming wet the strain set up in the canvas drill may render it difficult to disengage if it was pinned both at top and bottom thereby allowing nothing for shrinkage. By these methods both ball and canvas triangle are easily removed and as they are threaded over the mast it is impossible for them to blow away in case the lacings should fail.

COLOR

It is very necessary that the color of a mark should be such as to render them as conspicuous as possible. Two shades only should be used and each must have the greatest surface possible for the mark boat to carry.

The basic idea is contrast. If the background is dark the mark should be white and vice versa. As it is either one or the other both a light and a dark spot on the mark must be provided. The best arrangement is to make the top mark (the ball) dark, and the lower mark light. When running out where the sky and water appear to meet or where land is lower and hazy and hardly visible, the dark ball will stand up in the sky as a black object. But when running towards shore when there are trees and other dark objects the white triangle will stand out in good shape.

The best color for the ball is red as in addition to appearing dark in the distance it is helpful sometimes when approaching a mark where the view is sometimes somewhat obstructed by the spars and rigging of boats at anchor as you can often get a quick glimpse of the red without having to identify the shape.

Instead of using different colored balls it is better to paint a large black number about 2 feet high on the white triangle and place in one, two, three order. This will enable the contestants to be sure that they are turning the marks in correct sequence. It has also the advantage that the race committee can refer to the marks by number instead of having to describe them. It is much simpler to say "leave mark No. 2 on the port hand" or, start and finish at mark No. 1."

(*Continued on page* 68)

A Vibrationless Cruiser

Enterprise II Designed to Travel at 24 M. P. H. with the Tremble Eliminated, Can Maintain Above a 20-Mile Speed All Day Long and Can Go 500 Miles without Replenishing Fuel

MRS. W. PLUNKETT STEWART, well known in the social circles of Philadelphia, has a penchant for owning splendid motor boats. Mrs. Stewart is a yachting hostess of note and when in the summer she devotes much of her time to the water she likes to take parties of friends with her. All of which leads to the fact that when Mrs. Stewart a-motor-boating goes she wishes to have the maximum of comfort for the size of her craft.

Enterprise II has been designed to make a 500-mile cruise without replenishing fuel. She was built for Mrs. W. Plunkett Stewart, prominent society woman of Philadelphia

With this in view Mrs. Stewart commissioned Bowes & Mower, the Philadelphia marine architects, to design for her a motor yacht that would embody her requirements, and Bowes & Mower decided that nothing could give more real comfort to a party of Mrs. Stewart's friends than a vibrationless cruiser. Not even the most elaborate fittings were as conducive to absolute solid comfort than the elimination of vibration was their determination, and so Enterprise II came into being as an almost wholly vibrationless motor yacht. Not that Enterprise II has not had installed all of those 1001 little features that aid so materially in the pleasure enjoyed in yachting, for she has, but it was to the type of engines to be used that the architects devoted most of their thought.

F. S. Nock, of East Greenwich, R. I., the builder, was instructed to install Twin Model F eight-cylinder, 200 h.p. Sterlings of the counterbalanced crankshaft type, turning 1,100 r.p.m. The motors even at maximum r.p.m. are practically vibrationless, and when driving this vessel at top speed are designed to eliminate the slightest tremble which usually accompanies a high-speed cruiser, and Enterprise II is a 24 m.p.h. boat. She is 66 feet in length, has a beam of 12 feet and a draft of 3 feet.

Mrs. Stewart also decided that Enterprise II should be so completely equipped that she should be capable of a 500-mile cruise without replenishing her fuel supply. She is also quite capable of traveling above a 20-mile speed all day long, which allows the possibilities of cruising over 200 miles a day.

The illustration of the saloon aptly indicates the finish of the interior, which it may be noted, in passing, shows that it has been designed with a view of giving the appearance of roominess rather than elaborateness, but at the same time the fittings and furnishings are of the highest grade. The installation of the twin motors with exhaust outboard, and ample space between and at each end, has been neatly executed. It will be noticed that Enterprise II is a beautifully clean running cruiser, and that in addition to a commodious interior, ample space has been provided on the decks and in the pilot house for day cruising.

Luxurious interiors throughout the craft have been achieved and with the elimination of practically all vibration sleeping is made really restful. Cabins were planned with the simple artistic in mind

Sterling Twin Model F eight-cylinder engines of 200 h.p., of the counterbalanced shaft type, turning 1,100 r.p.m., and constructed to eliminate the slightest tremble are installed. Enterprise II is capable of making 24 m.p.h.

Two Men, a Maid and a Boat

The Crew of Three Were Fancy Free and So They Sailed Upon the Sea Boojum Though a Little Boat Never Once Refused to Mote

WE were a sorry-looking spectacle that August afternoon, two men, a maid, and a boat, wet and bedraggled, our oil-skins, in the fashion of oil-skins, sticking to ourselves and everything else, our boat, Boojum, tied fast to Murphy's wharf at Bass Harbor, Me., hemmed in on all sides by a heavy, sticky fog. From Swan's Island we had had an eventful trip across Blue Hill Bay in the fog, steering by compass, a 200-pound man groaning in the cockpit. Here at last we were in Bass Harbor, having shipped Frank and his inflammatory rheumatism to the Bar Harbor Hospital via the ubiquitous Ford.

The fog lifted a trifle as we recrossed the bay to Swan's Island, but the gloom inside the boat thickened. Frank had come to Maine straight from a New York editorial office with the avowed intention of assisting Bayard in taking Boojum down the coast, a trip of 500 miles.

Although he boasted membership in the Adventurers' Club, Frank admitted that he had never journeyed beyond Shelter Island. But scornfully he waved that little fact aside. Nor for him the Cape Cod Canal! A trip around Cape Cod was to be the price of his assistance. Alas, poor Frank! The daring fellow met his Waterloo in the shape of a bad case of inflammatory rheumatism while fishing for the well-known Maine pollock from a rowboat tied fast to the dock.

Still, Boojum had to go to New York. It couldn't be done single-handed. Rather resentfully had I watched the preparations for the cruise, for despite my entreaties I was to be left behind. Five feet of femininity might be cute, but it wasn't much use on a coastwise cruise in a 28-foot boat. Thus was my quest for romance and adventure to be killed. With Frank safe in the Bar Harbor Hospital, however, my chances improved, and soon I was cutting the bottoms off a pair of old white trousers and preparations for the cruise were continued.

Boojum is a 29 x 7-foot, Hand V-bottom craft, equipped with a 21 h.p. Campbell motor—fortunate motor, indeed, for it occupied the tiny cabin, while we ate, slept, and worked in the open cockpit, protected from sun and rain by a khaki top. Under the most favorable conditions Boojum makes 12 miles an hour, but heavily loaded and towing a stout dingy (and on this trip we were heavily loaded and we did tow a stout dingy) we could do little better than 7 or 8 miles an hour.

Our preparations were completed, our provisions stored aboard by the last day of August, and we went to bed filled with that small boy sense of adventure which is not the least charm of runabout cruising.

On the morning of September first a perfect sunrise proclaimed a beautiful day. Never during the whole summer had the sky and water shown such a melting blue; never had the green of the seaweed contrasted so richly with the pink of the granite rocks. How I hated to leave it all, but I donned my white duck trousers and flannel shirt, and with a wistful backward look at the little green cottage nestling close to the shore, we rowed out to Boojum, turned over the engine, cast off the gay green and white buoy and started with a great waving and cheering from the interested natives. But alas! the mooring refused to be cast off and twined itself lovingly around the propeller shaft, only to be severed a few minutes later by the cruel knife.

Milady's toilet was made in the cramped quarters of Boojum's little engine-room. The bathroom was limitless in size—the Atlantic

Three meals a day and meals for three were all prepared on a one-burner stove but the cook was good, which compensated for much

At 10:20 o'clock we were speeding out through the Golden Gate, past the deserted granite quarries of Orino, beyond Seal Ledge, startling the occupants of that slimy rock into hasty diving. A few minutes later they reappeared, twenty seals, their sleek, round heads bobbing up near the boat, for they are very tame and very inquisitive in those waters. Soon we left them astern as we entered the five-mile stretch of water known as Jerico Bay. Crossing in good time, we passed the quarries and ugly red brick buildings of Stonington on Deer Isle just as the noon whistle blew.

The skipper was a powerful man. Powerful in several ways. Mostly powerful tired

Our way through the narrow, rock-menaced, wind-protected passages between the many islands was calm and peaceful, but when we struck out by the Monument and into West Penobscot Bay we found a stiff breeze blowing and encountered a heavy chop. I had had no experience with rough water—all my sailing having been in fair weather—and the sight of the small pleasure boats turning back into sheltered water before the fury of wind-swept Penobscot, and the heavy rolling of the boat as the spray blew into the cockpit, caused me to lose some of my adventurous spirit and to think with foreboding of the trip ahead. Eagerly I sought for Owl's Head Lighthouse, which marks the end of the promontory affording protection to Rockland Bay; at last, after much straining of eyes, it came into view and another short run across comparatively quiet water brought us up to the Rockland dock, where we anchored at 2 o'clock.

A waving of hands attracted our attention to Belle, a fishing smack which we had come to know from its frequent visits to Swan's Island, where it bought lobsters and sold bad beer and worse whiskey to the fishermen. But we had little time for salutations, for there were many things to do in Rockland, purchases to make, and money which had been telegraphed from New York to collect.

By 3 o'clock we had washed, dressed, and walked the long avenue that leads up from the fish wharf to the one real street of Rockland. Our first thought was for food. Bacon and eggs were tried in one or two places, but even our wolfish appetites couldn't stand the messes served us, so we hied ourselves to the Copper Kettle, where we got better fare at higher rates.

Then to our shopping. Anticipating a cold run down the New England coast, we bought woolen stockings and woolen gloves; we tried to buy a woolen steamer rug. To that end we went to the most fashionable department store in the city of Rockland. We followed a smiling sales clerk out into the window facing on Main Street where were exhibited the entire collection of steamer rugs. A low-priced black and white rug took our eye.

"Of course it's all wool," assured the clerk to Bayard's suspicious query.

"What percentage of wool is really in it?" questioned Bayard, pulling suspiciously but ignorantly at the blanket.

The salesman hesitated, hemmed a little, then coming to the correct conclusion that his customer knew as little as he did himself anent the amount of wool in that particular blanket, suddenly lost his smile and wanted to know: "What the dickens we meant anyway by doubting his word." His racket and my short hair claimed the attention of the passing citizens of Rockland and a crowd gathering before the window, we hastily and apologetically bought the rug.

It was 6 o'clock, bright daylight when we returned to the boat, and the wharf near which we had anchored was still noisy. As the engine fully occupied the cabin, we were to sleep in the cockpit. Undressing and going to bed in so public a place was impossible, so hauling anchor we ran around to a little cove on the other side of the steamer dock, where, to our surprise we found the yacht Thelma anchored. We had become friendly with her captain early in the summer when the yacht took refuge from a fog in our own little harbor at Swan's Island. Then he had promised to show us over the boat when next we met, provided her owner was not aboard. Now the empty flag staff told us the road was clear and tooting our whistle madly we circled the yacht several times. With all our noise, the Swede placidly polishing the ship's handrail didn't deign even to look up, so relinquishing our hope of dining aboard we sneaked into a corner of the little cove and anchored.

"Oh for a peaceful smoke," quoth Bayard lighting a cigarette as he settled down into our one chair. A sound of tearing canvas, a loud crash and Bayard found himself on the floor where he finished his smoke in the peace he craved.

Undressing proved a humorous undertaking, for as Mr. Dooley says: "It's no easy matter to take off your clothes when you are sitting on them." But at 8 o'clock all preparations were made for a quiet night and we rolled in, the Rockland mosquitoes sounding taps.

At 4 o'clock the next morning we were up and doing, and before hauling anchor there was much to do. First we got into our damp, uncomfortable clothes, stumbling about a cockpit full of mattress and blankets; then we took turns washing in a tiny hand-basin in a very limited supply of water. The mattress had then to be rolled, tied, dragged through the tiny cabin and stuffed away under the forward deck. Usually Bayard, clasping the huge thing tightly in his arms would get stuck in the cabin door when I would have to pry him out and the mattress in.

For stowing away the bed clothes, Bayard had a system all his own. I thought and still think it a poor one, but then what do females know about packing. The system was this: The bed clothes were divided always into three parts. Section one was rolled tightly, wrapped in a strip of canvas, corded, and tucked away beside the mattress. Section two, also rolled tightly was forced into a deep canvas bag. The third division, namely, the troublesome steamer rug, he folded neatly, covered it with a rubber coat and set it away beside the gasoline tank under the forward deck. I never did learn why things had always to be put in the same place, why, for instance, the steamer rug shouldn't be wrapped in the canvas or stuffed into the bag. Anyway, the rolling, wrapping, cording, and dragging-through-the-cabin-process always made me cross for while

(*Continued on page 96*)

Milady wore her hair cut short, but unlike Samson it did not impair her strength, and so she did a man's work

What to Blow and When to Blow It

Rules of the Road Made Easy—Graphical Explanation of the Various Meeting, Passing, and Overtaking Situations

By Charles F. Chapman

TO most motor boatmen the expression "Rules of the Road" means nothing whatsoever. They may remember having heard of it once upon a time or perhaps seeing the words in print on the title page of that little pamphlet, two copies of which the Government requires all motor boats to have aboard. But, further than that they are not interested. One or two or three or four blasts of the whistle means nothing to them than "how's the world using you today," or perhaps, "have another one on me." And it seems as though the good Providence watches over and protects these skippers, their crews, and guests. The only right of way they know of is the right to go as they please anywhere the speed of their craft will carry them. The rights of others are not worrying them. Why should they, they argue. Are not the seas free now that the war is over?

Then there is another class of motor boatmen who pictures the Rules of the Road as the food of admiralty lawyers, something so confusing and so complex that they will never be able to understand them. They reason that they have gone through life thus far without serious consequences or accidents, so why bother this late in life with such mysterious quantities. This class of boatmen are generally very careful in the handling of their boats and some of them even so timid that when an approaching steamer signals them one blast on her whistle they turn about and go as fast and as far from the scene of action as possible. Safety First is their motto, and a very good fundamental principle to follow, too.

But those belonging to either of the above classes are wrong and by their attitude they are missing fully fifty per cent of the fun of boating, besides making a sport, which otherwise would be the safest in the world, dangerous to themselves and others and a menace to commercial shipping interests.

The Rules of the Road are not something to be shunned or avoided, they are not complex or confusing. Quite to the contrary, they are, or should be, every motor boatmen's friend. They are simple and understandable and tend not only towards safety but make boating more worth while.

A sport like anything else to be enjoyed properly means application—its success is to be the measure of enjoyment. Whenever the problem is a knowledge that should govern that splendid and manly sport which you and I play at, it should be a source of gratification to make ourselves a little better in our play. To those who say it is old stuff, that they have heard it all a hundred times over and remember everything they have heard, there can be but one answer—there is still much to learn.

In discussing the subject of navigation we may feel sure that we are dealing with the highest authority in the land, for it is Congress itself which is given power by the Constitution of the United States to regulate such matters. Congress has control of all the seas within the so-called three-mile limit, those waters which empty into the sea, and waters which are not entirely within the boundaries of any one state. However, Congress may delegate as much of its control as it sees fit to other parties who are authorized to make special or local rules which, of course, must not be contradictory to any rules made by Congress. Thus we have Congress specifying near the beginning of the navigation laws "That the following regulations for preventing collisions at sea shall be followed by all public and private vessels of the United States upon the high seas, and in all waters connected therewith, navigable by sea-going vessels."

At first glance it would appear that this act had provided for inland waters navigable by sea-going vessels, as well as for the high seas. As a matter of fact, however, Article 30 of the Act declares:

"Nothing in these rules shall interfere with the operation of a special rule, duly made by local authority, relative to the navigation of any harbor, river, or inland waters."

The local authority here referred to may be Congress itself or the Board of Supervising Inspectors, for we read in the Act of 1897, Section 2: "That the supervising inspectors of steam vessels and the Supervising Inspector-General shall establish such rules to be observed by steam vessels in passing each other, and as to the lights to be carried by ferryboats and by barges and canal boats when in tow of steam vessels, etc., not inconsistent with the provisions of this Act, as they from time to time may deem necessary for safety, which rules when approved by the Secretary of Commerce are hereby declared special rules duly made by local authority."

The rules made by the board of supervising inspectors and approved by the secretary of commerce are all published in a book entitled, "Pilot Rules for certain inland waters of the Atlantic and Pacific Coasts and of the Gulf of Mexico." Included in this publication is the Motor Boat Act of 1910 which regulates the well-known rules for lights, whistle signals, equipment, etc., for motor boats.

There seems to be a few points on which the various Acts of Congress do not touch which may, therefore, be assumed to be left to the individual states and communities to regulate and enforce. These include such rights as might be classed as police duties, harbor regulations, anchorages, speed limitations, and the like. Matters pertaining to channels, dredgings, pier head lines, docks, etc., are left to the war department by Congress.

In the handling of small boats, particularly motor boats which are easily controlled and maneuvered, there is one rule to follow, a rule which has no exceptions and which if followed and executed with care and thought will never fail. This rule is—

SAFETY FIRST

One may know the navigation laws by heart and feel certain he is correct in taking a certain action or course with his boat, yet if an accident does happen, even the correct action which he took may have contributed toward the accident and, therefore, made him partly responsible and liable, the degree of which must be determined by the court.

I base this statement, which may appear to be a rash one by many motor boatmen, upon what I consider the most important ruling on the navigation laws particularly as referring to motor boats. This reads as follows:

"When in consequence of thick weather or other causes the vessel which has the right of way finds herself so close that collision cannot be avoided by the action of the giving way vessel alone, she also shall take such action as will best aid to avert collision."

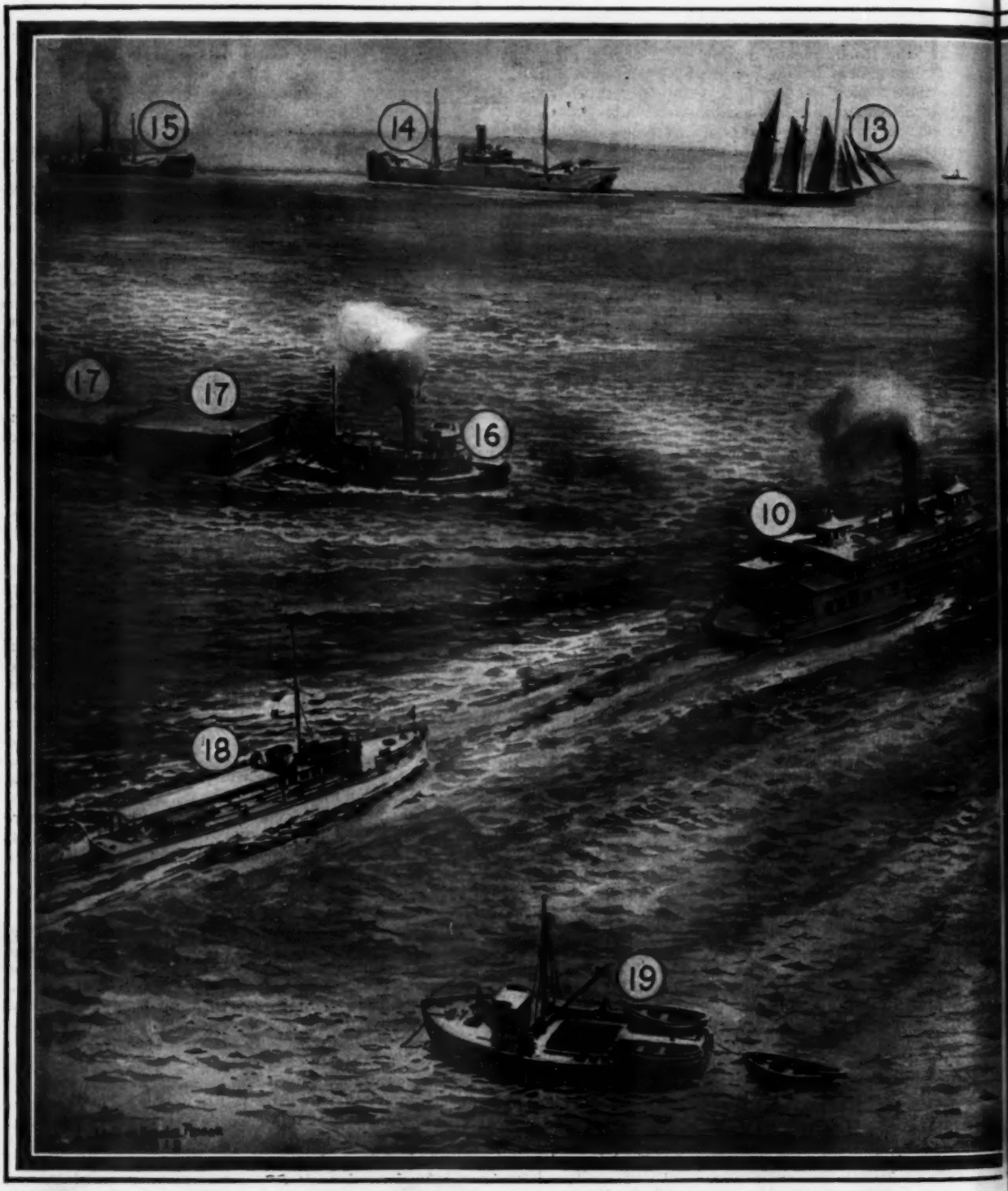
By the above ruling you will see responsibility for any accident is up to the masters of both boats. That is, if for any reason an accident cannot be prevented

(*Continued on page* 26)

What Would Be Your Action if You Were

The Rights Peculiar to Each Type of Vessel, What Each Must Do When It Gets into a Tight Situation and Its Proper Action Relative to Other Craft

(*See explanatory text*

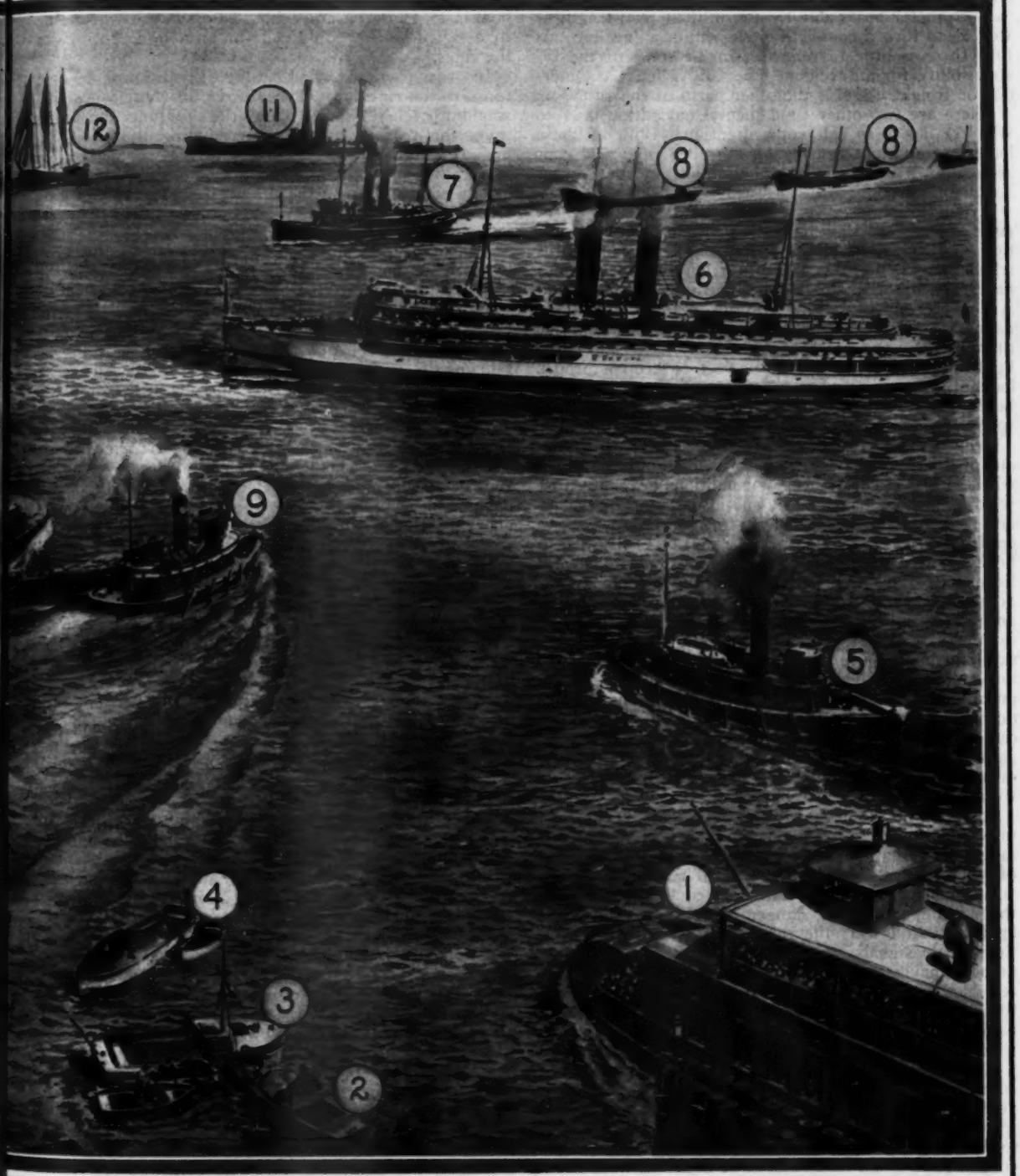


(1) *Ferryboat, which shortly will be crossing through traffic, coming out of a slip*
(2) *Small open motor boat of Class I in collision with* (3) *a motor cruiser of Class III*
(4) *Motor boat of Class II standing by to render assistance to the boats in collision*
(5) *Harbor tug (without tow) backing*
(6) *Inland steamer crossing the bows of* (9) *and* (10) *and passing* (16) *on her own port side*
(7) *An ocean-going tug with a tow of ocean-going barges*
(8) *Ocean-going barges in a tandem tow*
(9) *Harbor tug running on a parallel course with* (10)

The Skipper on Any of These Craft?

The Only Proper Course to Follow—Making Sure That Your Action Is the Correct One—Why Safety First Should Always Be the Governing Factor

on pages 23 and 26)



Drawing by William H. Foster

(10) *Double-ended ferryboat running on course parallel to that of steamer* (9)
(11) *A U. S. battleship at anchor*
(12) *A sailing vessel on the port tack, crossing course of* (13) *and* (7)
(13) *A sailing vessel on the starboard tack*
(14) *and* (15) *Ocean-going steamships meeting head on*
(16) *A harbor tug with a tow of scows* (17)
(17) *Scows being towed tandem in a harbor*
(18) *A fast motor cruiser overtaking* (10) *and approaching the course of* (16) *on a course more than two points abaft sixteen's beam*
(19) *Fishing vessel at anchor*

What to Blow and When to Blow It

(*Continued from page* 23)

by one of two boats, namely, the boat supposed to give way, then the other must do all in her power to prevent an accident.

With motor boats able to stop in their own length as well as to turn a complete circle within a few seconds time there is little to relieve them of some of the responsibility for an accident especially when a commercial or freight vessel is the other party of the situation.

There are two other fundamental navigation laws to which I desire to call your attention. Both of these have an important bearing on all other rules and consequently deserve particular attention by the motor boatmen.

Article 27 states, "In obeying and construing these rules, due regard shall be had to all dangers of navigation and collision, and to any special circumstances which may render a departure from the above rules necessary in order to avoid immediate danger;" and Article 29, which states, "Nothing in these rules shall exonerate any vessel, or the owner or master or crew thereof, from the consequences of any neglect to carry lights or signals, or of any neglect to keep a proper lookout, or of the neglect of any precaution which may be required by the ordinary practice of seamen by the special circumstances of the case."

From the above one will see that a departure from any of the specific laws regarding navigation is allowable when special circumstances or conditions develop. Just what is included or meant by special circumstances cannot be preassumed. When the master of a vessel is confronted with a sudden peril so that he is justified in believing that a collision or accident is inevitable and he exercises his best judgment in the emergency his action even though it be unwise and may have caused an accident which otherwise would not have occurred, cannot be regarded as a fault. On the other hand Article 29 contains a provision that nothing in the navigation rules exonerates any vessel for the neglect of any precaution which may be required by the ordinary practice of seamen or by the special circumstances of the case. In other words, the former article gives the navigator considerable latitude in choosing what action he must take while the latter makes him directly responsible for any breech of rules on his part.

A very important thought which should be kept in mind at all times is that the navigation rules provide for safety in navigation even without recourse to the giving of whistle signals in clear weather. This does not mean you should not omit to give them because the giving of them is imperative but danger of collision is guarded against by following the rules quite aside from giving the whistle signals. Such being the case, then if one properly navigates, the giving of whistle signals may be regarded something like giving a triumphant scream that we propose to do the right thing. There is nothing novel in this idea. Sailing vessels get along entirely without sound signals except in foggy weather.

Another consideration which should be kept in mind is what bearing a whistle signal which has already been given has on the subsequent action of the boat. In other words, if whistle signals have been given and assented to does this proposal and acceptance from then on become a governing rule or may it be departed from without a new signal.

As already mentioned the giving and exchanging of whistle signals is simply a means to accomplish a desired end to a navigation situation and the rules provide the same end even if the whistle signals are omitted. Therefore, the giving and exchanging of the signals does not change the situation in the slightest. There is a correct action for each boat to take provided by the rules and a departure from this correct action by either boat is not allowable and cannot be justified by the giving of a signal which would call for an action contrary to the rules.

In order to define when danger of collision is deemed to exist, the rules provide for three different zones surrounding each vessel and names the situations depending upon the particular zones surrounding the vessel in which the other vessel is located at the particular time in question.

The names given to the three situations are—1, Vessels meeting head on; 2, Vessels crossing; and 3, Overtaking vessels.

The overtaking situation is most clearly defined and exists when one boat is overtaking or approaching the course of another from a position more than two points abaft the overtaken vessel's beam either on the starboard or port side. The overtaking vessel has no rights as long as she remains the overtaking vessel and she remains the overtaking vessel until she is past and clear of the vessel overtaken. No subsequent alteration of the bearing between two vessels puts the overtaking vessel in another class or gives her any rights until she is past and clear. If there is any doubt in the minds of a skipper as to whether his vessel is in the overtaking zone or not, he must immediately assume that she is and be guided accordingly. As the overtaking vessel has no rights she must not attempt to pass the leading or right of way vessel unless the latter gives her permission to do so.

The head-on situation or zone is fairly well defined as existing when two vessels are approaching each other head and head, that is, so that the masts are in line or nearly so. The only joker in this definition are the words "or nearly so" and this must be left to be determined by each skipper.

In the head-on situation neither of the two boats is deemed to have the right of way but each must give one blast on her whistle and sheer off to starboard so that the two vessels will pass at a safe distance apart port side to port side.

The remaining situation, that of crossing, is not defined except by a process of elimination of the other two.

In determining which of two boats has the right of way in the crossing situation or zone, this can be best remembered by keeping in mind that any boat approaching or crossing in a zone extending from a point directly ahead of your boat to a point two points abaft the starboard beam of your boat has the right of way over you. This zone might be termed the danger zone, and it is the only zone about which you need have particular concern as boats approaching or crossing from any other position either on the port or starboard side forward or aft of the beam must keep out of your way. The correct whistle signal for this situation is one blast, which signal is to be answered by one blast from the other boat.

As to the action called for by one or two blasts of the whistle there is a very simple rule which if kept in mind will assist all skippers to remember whether he is to pass to port or starboard, ahead or astern of the craft giving him the signal. The rule will also hold good when the man at the wheel of your boat wishes to indicate to the other craft what action you are to take as well as the course you wish to follow providing you are the right of way boat and have the right to dictate to him.

(*Continued on page* 58)

SMALL MOTOR BOATS

Their Care, Construction, and Equipment

A Monthly Prize Contest Conducted by Motor Boatmen

Questions Submitted for June Prize Contest

1. Describe and illustrate with drawings if possible, what you consider the most novel or interesting motor boat race which you have witnessed.

(Suggested by H. A. H., Baltimore, Md.)

2. Describe and illustrate with sketches the construction of a light removable cabin for use on an open boat, which is of suitable design to carry it.

(Suggested by C. E. B., Fall River, Mass.)

3. Suggest the most desirable interior arrangement plan for a 25-foot cruiser using diagrams, if necessary.

(Suggested by A. R. T., New York City)

Rules for the Prize Contest

ANSWERS to the above questions for the June issue addressed to the Editor of MoToR BoatinG, 119 West 40th St., New York, must be (a) in our hands on or before April 25; (b) about 500 words long, (c) written on one side of the paper only, (d) accompanied by the senders' names and addresses.

The name will be withheld and initials used.

QUESTIONS for the next contest must reach us on or before April 25. The Editor reserves the right to make such changes and corrections in the accepted answers as he may deem necessary.

The prizes are: For each of the best answers to the questions below, any article or articles sold by an advertiser advertising in the current issue of MoToR BoatinG of which the advertised price does not exceed $25, or a credit of $25 on any article which sells for more than that amount. There are three prizes—one for each question—but a contestant need send in an answer to only one if he does not care to answer all.

For answers which we print that do not win a prize we pay space rates.

For each of the questions selected for use in the following month's contest, any article or articles sold by an advertiser advertising in this issue of MoToR BoatinG, of which the advertised price does not exceed $5, or a credit of $5 on any article which sells for more than that amount.

All details connected with the ordering of the prizes selected by the winners must be handled by us. The winners should be particular to specify from which advertisers they desire to have their prizes ordered.

Anti-Fouling Paint Best Barnacle Remedy

Answers to the Following Prize Question Published in the February Issue

"Is it possible to keep a boat free from barnacles in salt water? If so, how?"

A Good Bottom Paint Keeps Barnacles Off

The Prize-Winning Answer

KEEPING the bottom of a boat clean during the season depends upon the paint on the bottom. While this remark will be noted with a smile it is well to stop and consider. A new boat, for instance, will have perhaps two coats of anti-fouling paint when it goes overboard and the first thing we know the craft is all fouled up, then we haul out, scrub off the whiskers and some of the already too thin coat of paint, then into the water again. In the fall we haul out for the winter and after much cleaning and consultation decide to use some really good paint for the next year and the brand is changed upon the advice of a friend with no better results than before, and so the story goes. Now the whole substance of the argument is this, select the anti-fouling paint which in your own judgment is good, and they are all good, and having started on a clean bottom, never change the brand. At first it will foul a little and as time goes on with the addition of more coats from season to season a body will gradually be built up which is only slightly inferior to sheet copper. Never put one kind of anti-fouling paint over that of another brand or you will be sorry. I have always noticed, especially on my own boat, that grass and marine growth accumulates where the bottom paint covers the margin of the topside paint at the waterline while the rest of the underwater body is covered with a light coat of slime. As for barnacles, they are not serious, but if they persist in the early stages of painting it is well to remember that they only seed in August and if they succeed in getting a hold on the bottom a slight scrubbing as with a broom will take them off, they being then soft and without the customary shell so familiar to us all. I have previously said that all bottom paints were good and in forming my judgment there are two kinds, one is the real copper paints all of which seem to have a foul smelling liquid in their makeup, those of the brown shades are absolutely good and what is more are cheap in price. Then there are the light greens which are composed of various chemicals according to a "secret formula." These are also good, one especially beautiful light green has been my favorite for years and, although the makers thought it was worth $10 a gallon last year, I was still loyal to my opinion that the brand of bottom paint should never be changed and my boat below the waterline is still light green. The theory of bottom paints is well to consider; a successful paint should show flat after a few days' use, that is, have a dull dusty surface when dried out. In this event, especially in the case of the brown kind, it will smear the anchor rope, then upon your hands and perhaps upon your clothing, but that is all right, for down the stream comes a bug who says, "Here is a nice place to hang up" and immediately fastens himself to the boat only to get his face full of brown poisonous powder, just as anchor rope did, and in sickness and disgust falls off the boat. I hope that he dies! For those who question my remark on the surface of bottom paint I will say use a gloss surface for racing and a dull surface for bugs.

C. E. G., Beverly, Mass.

A Wire Brush Underneath Operated From the Deck Does Wonders

THE species of barnacle commonly known as the ship barnacle attaches itself to floating logs and ship's bottoms by its head by means of a cement-like secretion. Aside from diminishing the speed they do the ship no harm, and it has been claimed that piling covered with barnacles outlasted others not so covered; the barnacles being found a protective covering. However, we do not want our motor boats protected by barnacles.

The manufacturers of certain anti-fouling bronze compositions claim that their product will prevent the barnacle from attaching to a boat painted with it. They show two boats that were anchored all season in the same waters frequented by barnacles, one painted with common copper paint and the other with their patent preparation which protected it from barnacles and none were attached. The manufacturer should know if his product and its application will prove valuable as an anti-fouling paint.

A boat to which barnacles have become firmly attached must be hauled out, scraped, sandpapered, and repainted; by going over the submerged portion of the hull with a wire brush every week or two the barnacles which are just getting a hold may be scraped off.

The brushing may be done without hauling out by fastening two or three stiff wire brushes to an oak board about 1x8x14 inches. Bore holes at each corner and attach a short bridle, to which attach a light line long enough to go under the keel and come on deck. The brush is operated by sinking it under the bow, and then by pulling first one line and then the other, all the time keeping the lines taut, the brush can be made to travel over the underbody of the boat from keel to waterline and by moving along the entire sides of the boat may be cleaned. Keep at it and you can keep the barnacles off. Let them get a good hold and you must do treble work to pay for your neglect.

W. B. M., Newburgh, N. Y.

Tides, Terrain, and Temper Play Important Parts in Launching

Answers to the Following Prize Question Published in the February Issue

"How can a small crew most easily and safely launch a heavy cruiser of moderate size after her spring overhauling is completed. Illustrate if possible."

Launch at Low Tide

The Prize-Winning Answer

WITH the spring overhauling thoroughly completed and the paint and varnish dry and hard, each and every boatman whether old hand or new comer is eager and anxious to get his craft afloat. The old experienced hands at the game get their craft overboard safe and sound without a scratch and with harldy any seeming effort and what is more to the uninitiated they have but a surprisingly small crew to help them do it.

The trick, however, as in everything else lies in the fact of knowing how to go about it right in making the best use of the things available to work with. The average small cruiser can be put overboard safely with a crew of four or five men and a little deadwork, by following out the suggestions as hereinafter described.

Of course, first of all local conditions enter into the task and they must be considered before going ahead. Select a launching day with low tide about mid morning and aim to have your craft way out off the beach at turning time. Remember there is nothing any more discouraging than starting your boating season with an accident so "play safe" in each move you make.

First of all the craft will perhaps have to be raised in order to get stringers or skids for a cradle underneath her keel. This can be easily accomplished by means of a long piece of beam fixed as a pry or lever. By placing a piece of blocking close to the keel for a fulcrum, thus securing a short purchase, any amount of power can be obtained by a couple of men bearing down on the long end of the beam. Before attempting to raise the hull in any way suitable, shorings should be placed along the sides to prevent the craft from tipping. All this is quite clearly illustrated in Fig. 1 of the accompanying sketch.

After the boat has been raised and blocked and when the timbers that make up the launching skids are all securely fastened together three or four good wooden, or pipe rollers of about four-inch diameter can be placed on a couple of parallel planks laid below the skids and then the hull lowered down by means of the beam lever.

With the hull down on the launching skids or cradle it is well to pack some burlap bags, old canvas, or anything else of the like that is handy, between the painted sides and the portions of the cradle that are likely to mar the hull while same is being moved about.

If the design of the cradle requires it a few rope lashings can next be thrown over the boat to securely tie her down on to the skids. With all things thus she is ready to be moved to the place on the beach which has been decided upon as the most suitable for launching. The chief manner of applying the power for moving the boat is clearly shown at Fig. II of the sketch. A three-part tackle (block and fall) can be obtained from any boat club's locker keeper (upon solemn promise to return same safely). This can be rigged to a stout stake firmly driven into the ground in the manner indicated.

The craft can be hauled on the rollers in the direction desired over the parallel planks by pulling on the rope. An occasional pry forward with a bar or beam at the back end of the cradle will help the fellows doing the pulling on the rope.

As the boat moves forward the planks and rolls will, of course, have to be brought forward also, and it may be that the stake will also have to be shifted if the distance is too great for the length of the ropes. When placing the planks end to end it will without doubt save you considerable labor if the ends of each plank are laid on a piece of board. This will prevent the possible chance of the rollers getting down into a hollow from which they cannot be raised and will help to keep them going in the right manner from plank to plank. This is also shown in the sketch at Fig. III.

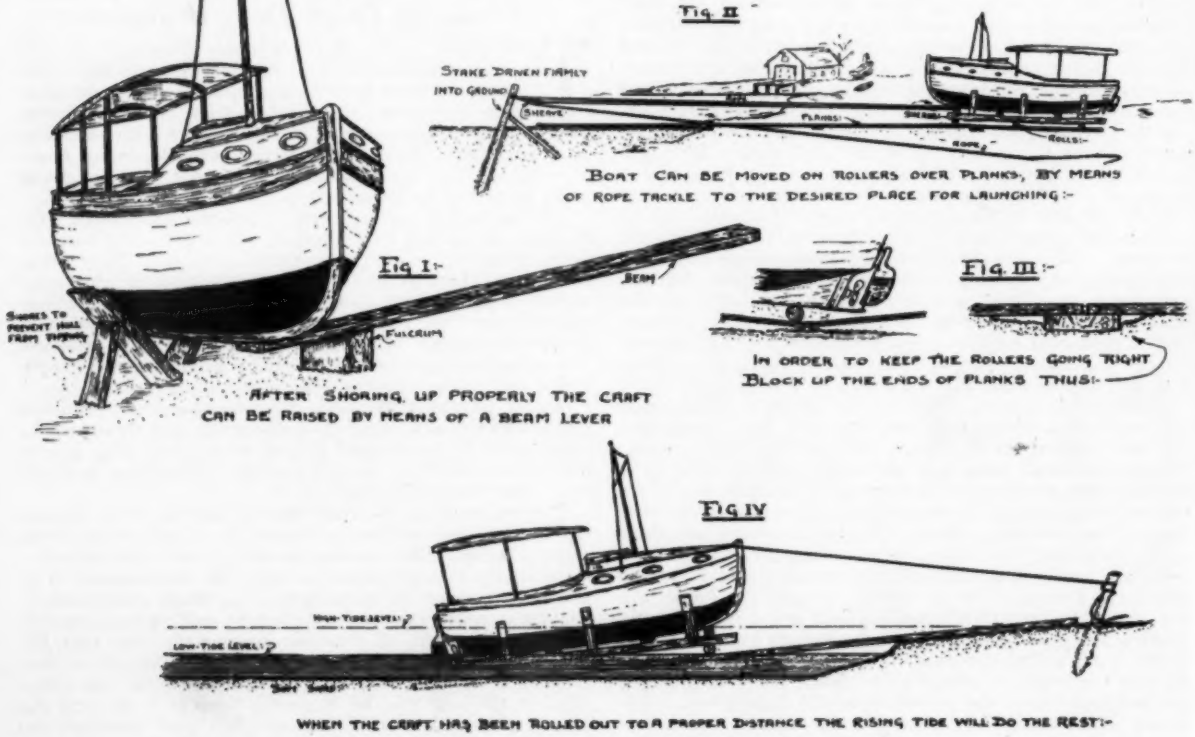


Fig II
STAKE DRIVEN FIRMLY INTO GROUND
SHEERS
PLANKS
ROLLERS
ROPE
BOAT CAN BE MOVED ON ROLLERS OVER PLANKS, BY MEANS OF ROPE TACKLE TO THE DESIRED PLACE FOR LAUNCHING:-
Fig I:-
BEAM
SHORES TO PREVENT HULL FROM TIPPING
FULCRUM
AFTER SHORING UP PROPERLY THE CRAFT CAN BE RAISED BY MEANS OF A BEAM LEVER
Fig III:-
IN ORDER TO KEEP THE ROLLERS GOING RIGHT BLOCK UP THE ENDS OF PLANKS THUS:-
Fig IV
HIGH-TIDE LEVEL
LOW-TIDE LEVEL
WHEN THE CRAFT HAS BEEN ROLLED OUT TO A PROPER DISTANCE THE RISING TIDE WILL DO THE REST:-

C. E. B.'s Method of launching a cruiser with a small crew to help

It may have been that the craft was so placed before commencing to move it, that it was easiest to pull same to the launching place bow first. However, on nearing the spot on the beach it is a simple matter to place the planks to allow for cutting the rolls so as to slue the boat around end for end so as to have the stern enter the water first.

Upon arrival at the water's edge the most difficult part of the work begins. It is now a job for rubber boots. The stake and rope tackle will have to be dispensed with and the boat moved forward the few remaining feet by prying with bars or beams. However, so long as the rolls are kept going right and always on the planks the craft can be forced out far enough for the rising tide to float later on in the day.

It is right here, however, where more than one impatient chap has fallen down. Too anxious to await the slow return of the tide, all "beef" has been put to it and a final shove given only to have the boat bang off the planks or roll into water not quite deep enough to float her. The result is generally a smashed rudder, a damaged wheel, or shoe, or a hole in the planking. Fig. IV in the sketch illustrates the safest way of completing the job and if you are to be away from the boat while the tide is rising the temporary stake mooring will be of added value.

C. E. B., Fall River, Mass.

Skids Are Important in Launching

SPRING is here and everyone in the whole boating fraternity is on the job, and they all know the pass word to insure a good summer's outing on the water. The painting and overhauling does not require many hands. The one job where plenty of help is most needed is the launching. Here is where brain and brawn work hand in hand making light of heavy work and a frolic out of labor.

If you cannot get a full crew for the launching don't feel blue. Cheer Up! The man with the smile always wins, and you are not stuck until you have tried your best and failed. Three or four men can launch a 35-footer with no more equipment than was used for hauling out with a full crew.

The first step is to jack the boat up on skids. A 4 x 10-inch plank and about 5 feet long will answer for a temporary foundation for the jack. As the boat is raised a little on each end at a time, keep blocking up under the keel so that should the jack kick out, the boat will not drop any appreciable distance.

The skids should not be narrower than the boat and their length not less than two-thirds the boat's length, and should be so constructed that they may be placed under the boat separately and bolted together after they are in place.

Cross bracing to prevent racking is essential. It is advisable to place the longer timbers for the bottom planks in the skids as they afford a wider range for shifting without a mishap. All bolt heads should be countersunk.

Place the slides in position under the skids before letting the boat down on them. All slides should be level and blocks nailed to the under side of the skids to prevent their sliding sidewise.

Rub the top of the slides full of soft laundry soap and put a little heavy grease on the skids where they will make contact with the slides.

Let the boat down by reversing the raising process, and, then contrary to common practice let the boat lay over on her bilge in such a position that the down side will be the last to enter the water and launch sidewise. In this position there will be no danger of the boat tipping and you will get the advantage of the boat's buoyancy before the keel is totally submerged.

The moving requires a block and fall and a dab or winch of some sort to pull or hold back with which will be found a great convenience or a luff tackle may be used to advantage. The luff tackle is a set of lighter tackle blocks hooked on to the main fall line and greatly increases the pulling power, but the motion is, of course, much slower. Do not attach a single line to the skids at the center to pull on. Make a bridle by fastening at the ends of the skids pull on the bridle, or place a long timber behind the skids and make the pulling line fast at its center. The bridle is preferable.

There is to be no "there she goes." You will let the boat down easy without a jar and show the crowd who have been smiling at your soap what an advantage it has over their rollers and a boat nicely plumbed on its keel.

When the launching is to take place on a beach get the boat as far out as possible and wait for the tide to raise, when she will just naturally float off. Where it is necessary to jump the side of a dock care must be exercised in placing the slides so that they cannot shift or tip as the weight moves. High tide is an advantage in such a case.

When the actual work is begun, select one man to engineer the job and let him do it without arguments and discussion at every move.

You will generally find that the fellow best fitted to handle the job is the man who offers the least suggestions, but just gets an idea of what is to be done and then does it without any hustle or bustle and all the while things are moving right along.

It has been taken for granted that no marine railway is available. Where one is available the time and labor required is much less and all the skidding necessary is onto the car. The boat may then be kept upright and launched at any tide.

W. B. M., Newburgh, N. Y.

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Terrain to Be Considered in Launching

IN order to give the best advice for a small-sized crew to launch a heavy cruiser of moderate size, it is necessary to know something of the surrounding obstacles. That is to say according to the location the cruiser is to be launched from. For instance the boat may be in a shed quite a ways from the water, or it may be necessary to go up over a steep banking and down over another, or it may be from a well equipped boat yard where all the gear needed for the event can be had for the asking.

Perhaps it may be from a wharf where it will be necessary to build a temporary runway or perhaps the road will be smooth or rough.

Now the first thing to begin with is a good stout cradle, which should be about three-quarters of the length of the boat, and wide enough to balance the boat properly. The cradle can be as elaborate or as simple in construction as one would care to make it. In most boat yards one can be had with rollers or wheels built right into it, one that all the boat owners use with entire satisfaction. If one cannot be borrowed it is a simple matter to construct one. Two pieces of fairly stout timber for the lengthwise part and three for the cross pieces, the center piece to be a little longer than the other two. Instead of wheels, rollers can be used. These can be had by cutting up an

(*Continued on page* 94)

Renew, Recaulk, Repaint—Then Go Into Commission

Answers to the Following Prize Question Published in the February Issue

"Explain the steps which should be taken to put into commission a hull which has been out of the water for one or more summers and has been more or less neglected."

Recaulk All Cracks and Seams

The Prize-Winning Answer

IN case the boat has been in storage under cover the job of placing her in commission will be small compared with what confronts one where the sun, wind and snow have made her a plaything and lopped off a bit here and there for toll. The boat out in the yard, even if covered with canvas, is likely to pull fastenings and loosen at the butts. This must be attended to first, refastening with screws to be plugged. Edges of planks cockle where the fastenings have drawn, so get them back before undertaking to smooth. Boring for screws will determine condition of frames, too.

Having refastened the hull partially fill the boat with water to swell the seams preparatory to hardening the caulking which would drive right through otherwise. When swelled, try the seams with a putty knife for loose cotton or soft spots. An experienced owner can recaulk pretty well but it is best for the novice to employ an expert, otherwise he might bunch the cotton and invite a leak where none would appear. Paint the seams with white lead paint to make the putty stick, then putty with a combination of whiting, white lead and litharge thinned with oil to workable shape. The litharge will harden the putty and minimize tendency to drop out. Some add varnish with satisfactory results.

Should the hull require dressing down to the wood a gasoline torch should be used unless the surface is so small that a patent remover may be employed advantageously. Don't let the flame linger longer than is necessary to start the paint frying, otherwise the wood will be scorched and, possibly, badly charred. A little practice will show how to use a torch but don't choose a windy day for then the flame goes all over the lot. Don't attempt to clean canvas with a torch for the material will be puckered out of shape. Remover is best for canvas but, all said, new canvas for cabin top and deck is about the best way out of it. Wood from which paint has been removed should be repainted with white lead and raw linseed oil for the first coat, boiled linseed oil and a little dryer for the second and third coat, all coats thin; finish with a turpentine paint or one of the paints containing zinc. One can buy prepared paint to good advantage and, if a little is left over put it in a slip-cover can for touching up.

Of course, there will be varnishing to attend to after oak or mahogany has been cleaned with remover but everybody who owns a boat or is about buying knows how that should be done. Having got the hull in shape for the water, bottom paint 'n' ev'rythin', make certain that every sea connection is sound, that the valves in the closet are right and the tanks, fuel and water, are clean. The rudder port, stern bearing and shaft should be inspected, flanges in the exhaust line given new gaskets and the lead scupper pipes examined for crystalization. This being attended to the motor and reverse gear may be overhauled as the work can be attended to while waiting for the yard man to get round to you with the launching ways, and, as a rule, one waits long enough at that stage of the game to fuss with a number of motors.

The boat stored inside ordinarily requires little else than painting and machinery attention and a few buckets of water swell her tight. At any rate, if you are in doubt, hunt up the chap with the "how to." If I am not mistaken he will put you wise on most any problem even if he has to rob his own time to be accommodating.

G. S. H., Boston, Mass.

Be Sure the Timber Is Sound and the Fastenings Firm

AN old boat hull that has been laid away for two or three seasons calls for a very careful inspection to ascertain, first, whether the hull is worth repairing and, second, the nature of the repairs that must be made.

If you now own the hull you naturally want to repair and use it again if possible, and in such case you only have to estimate the cost of repairs. However, if the hull is one you are considering purchasing you must estimate the value of the hull "as is."

I believe the two most important things to be sure of are, the condition of the timber and the fastenings of the hull structure. The matter is of enough importance to justify boring or cutting into the planking and ribs to see if the timber is reasonably sound, also to remove some of the screws or nailing to observe the condition of the metal. If the fastenings are in poor condition, while the wood is sound, I would go ahead and renew the fastenings, but if the wood is poor I would pass up the job. If satisfied that the hull is sound and worth repairing would make the following repairs in the order given:

First—Remove old paint and all loose caulking;

Second—Renew any parts of the framing or planking;

Third—Prime all new and old wood work;

Fourth—Caulk all seams;

Fifth—Paint inside and out for protection against water and weather;

Sixth—Apply decorative paint inside and out according to taste and style of boat.

A good paint job depends largely upon three factors:

First—A good start; a clean hull; no loose paint; thoroughly dry;

Second—Good quality of paint—not thick, mostly oil for first and second coats;

Third—Give each coat of primer or finish coat of paint plenty of time to dry; avoid blisters.

The fastenings should be proof against rust, and care should be taken that all nail and screw heads are well puttied in.

In general, if you are not in too big a hurry you will get a good job, while if you try to do the job in a few days you may have to do the work over or suffer the discomforts of a leaky boat.

L. R. L., Columbus, O.

Unsound Parts Must First Be Renewed

THE transformation that may be brought about in the condition of a hull, that has been neglected for a year or two, is nothing short of amazing. If the hull, machinery and equipment were in reasonably good condition when the boat was laid up, there is no reason why she may not be effectually restored and be made entirely seaworthy as well as neat and attractive in appearance.

After removing the cover that has sheltered the boat, a critical inspection should be made of every part of the hull, inside and out, from deck to keel, and a memorandum made of what renewals and repairs are required, together with an estimate of the necessary materials, which should be ordered in ample time for use on the work. Should such an inspection disclose any defects in, or injuries to, the structural members of the hull; such as cracked, ill-fitting or otherwise weak ribs; sprung, loose or unsound planking, these imperfections should be corrected by fitting new ribs or planking where required. The condition of fastenings of frames, planking, decks, etc., should be tested by removing a screw, rivet or bolt here and there, and in case rust and corrosion have impaired the strength of these a sufficient number of new fastenings should be added to insure against any weakness in these vital details. Renew worn rub streaks, chock rails and other parts that may have suffered damage. Any work on the interior woodwork or joinery should also be attended to.

If the paint on the sides and bottom has peeled, blistered or checked badly, it will be best to burn it off with the torch and to make the planking smooth with scraper and sandpaper. Next the caulking should receive attention. If the putty is porous or has fallen away and the cotton has become displaced or loose and uneven, clean out the seams with an iron which has been bent into the form of a hook and grind off so as to reach into the seams, being careful

not to dig into the planking. When the seams have been thoroughly cleaned, paint them with a seam brush and recaulk and putty in the same manner as for new work. Plug or putty all nail holes and other depressions.

Go over the decks in a similar manner. If of wood and the paint or varnish is in bad condition, this should be removed with paint remover and by scraping and sandpapering until a smooth surface is obtained down to the bare wood. Caulk and putty the seams, if required. If the decks are canvas covered, smooth them down with sandpaper held over a block.

The interior of the hull should be gone over thoroughly. Wash all soiled woodwork with water and Bon Ami, Dutch Cleanser or the like. Clean off all grease with a rag soaked in gasoline and after all grime has been removed, rub down the varnished surfaces with steel wool and the paint with steel wool and sandpaper.

Now thoroughly clean the whole boat of dirt and dust of every kind and put on the paint and varnish. All surfaces must be smooth, clean and dry. Sandpaper paint lightly between coats, using fine sandpaper and rub down varnished work between coats with steel wool. Use only the best quality of paint and spar varnish and allow ample time between coats for thorough drying.

If the different steps here outlined have been performed in a workmanlike manner the hull will be restored to practically its original condition so far as staunchness and beauty are concerned. G. F. E., Burlington, Vt.

Paint and Then More Paint

THE first operation in putting a neglected hull in condition is to thoroughly clean it inside and out. In order to do this remove everything movable so that there will be no places for dirt to hide. If possible remove the motor for its overhauling. Sad to say it generally has hidden under it a lot of grease and dirt.

Now a thorough scrubbing inside and out with hot water and a good soap powder will put things in shape to commence real operations. All soap should be washed off before any painting operations are started.

If the outside of the hull has been painted a number of times so that the paint is thick or if it has scaled off and is in bad condition it is advisable to remove it. The best way to do that is with a blow torch and scraper. If one is not used to this operation a little practice and some care are necessary. In using the torch don't hold the flame long in one spot or the wood will be scorched. Keep the flame moving over a small space and watch carefully and as soon as the paint becomes wrinkled and soft set the torch down and use a steel scraper to remove the paint. With a little practice it will not be found a very difficult job. After this work is completed a thorough sandpapering first with coarse paper and finishing with fine paper will put the work in condition for painting, unless it is necessary to recaulk the hull. In that case before removing the paint dig out the old caulking and clean the cracks, then remove the paint and caulk. After the first coat, putty all seams, nail and screw, all holes. A very hard putty can be made by mixing equal quantities of dry white lead and whiting, using two-thirds Spar varnish and one-third turpentine. This putty should be used where enamel or varnish is to be used but in case oil paint is to be used an oil putty should be applied, using white lead, whiting, boiled oil and a little turpentine.

The writer has used one of the paste caulkings, recommended by supply houses, in seams that were rather large and found it very satisfactory as it remained pliable enough to give and take as the planks swelled or contracted. Now as to paints, it is far better to use a prepared paint intended for the special purpose than to attempt to mix it. If the boat is large you will probably use a copper paint below the waterline and a good marine paint above. Be careful to follow the directions on the can as the manufacturers generally give the correct information on the use of their own product.

If the hull is small a very fine finish is desired, on the plain wood place a flat color, that is simply color ground in Japan and mixed with turpentine, don't use any oil, two coats will probably be sufficient. Now apply a coat of boat enamel color dry; then rub with curled hair to destroy the gloss. Apply another coat and perhaps the third. If the work is well done you will have a fine looking boat. Below the waterline a copper paint would be advisable unless the boat is removed from the water when not in use. The inside finish is largely a matter of taste. Paint and varnish that are in bad condition are better removed by burning or by means of paint remover—there are several good ones on the market. If you use them it is best to clean the wood afterwards with gasoline or turpentine before applying paint or varnish.

The hard putty mentioned in connection with outside paint should be used. It can be colored to suit the color of the wood or paint by mixing dry colors. If no paint is used below floors a good coat of hot raw linseed oil will help preserve the wood.

The decks will probably require all new finishing and probably caulking and puttying. Do this work good as much depends on tightness and appearance of the deck.

In replacing the motor if done before putting the boat into the water don't expect it will line up when the hull is soaked, as a dry hull nearly always changes shape more or less.

Place new packing under all water connections through the hull.

Before commencing painting it is well to tighten all screws and bolts that are loose.

In painting and varnishing be certain that one coat is thoroughly dry and hard before applying another.

D. E. W., Seneca Falls, N. Y.

Replace Defective Parts Then Spruce Her Up

THE last two boating seasons without doubt saw more boats left high and dry without attention than a good many of the previous seasons. The fact of their being out of commission, however, was not because their owners' enthusiasm had lagged (or because there was a tax to pay for there'll be another this year), but because for the most part their owners had gone boating for Uncle Sam on his big ships.

This year, however, things will be different and after a thorough overhauling and fitting out these same little craft should again go back into commission just as spick and span and sound as ever, and be good for many more years of continued service.

The first thing to investigate on all such craft will be the existing conditions of the various parts, making due note of all places which show the least signs of dry rot or appear in any way defective. After sizing up what there is to be done jot down a list of what will be needed to put her ship shape again and plan the different jobs so as to jibe right with the short intervals of time or week ends that you will be able to put into the work.

The very first actual work will be a thorough cleaning of the hull both inside and out. With all things properly cleaned to start with no matter what there is to be done later on each little job will be completed in a far better manner than if the same work had been done amongst dust and dirt or oil and grease.

After the cleaning will come the preparation of the hull for painting. It may be that a new piece of plank as previously noted is required here or a piece of molding there, some unsightly thing removed or altered and right now is the time to give them whatever attention is required. With all such things completed to satisfaction the scraping of the paint and bright work will be next in order followed by sandpapering down to smoothness. All loose putty filling the seams as well as loose and rotten caulking should be removed and the seams well payed with thick white lead so as to immediately receive new caulking. After the seams, checks, and dents have all been well filled in with white lead putty, a thorough smoothing with fine paper should be done above and below the waterline.

The priming coat of paint should then be applied and allowed to properly dry before the finishing coats are put on. With the hull back again to soundness and well painted above and below, the big job previous to the launching is perhaps completed. After the boat is afloat with the power plant installed the renovation above the decks can be best done.

C. E. B., Fall River, Mass.

Graphic Navigation

An Illustrated and Diagrammatic Description of Methods by Which the Position of a Ship at Sea May Be Determined without the Use of Higher Mathematics

By Capt. A. C. Knight

III—DETERMINATION OF POSITION (LATITUDE AND LONGITUDE) BY THE MARCQ SAINT HILAIRE METHOD—FROM OBSERVATIONS OF THE SUN

This is the third installment of Capt. Knight's series of illustrated articles on Navigation. Part I, which was published in the February issue of MoToR BoatinG, described graphically the determination of latitude by meridian altitude of the sun. Part II, published in the March number of MoToR BoatinG, went into the subject of the determination of longitude by means of a time sight.

In this month's installment, Capt. Knight takes up the determination of the position of a ship, that is, both its latitude and longitude by the Marcq Saint Hilaire method. This method has always been considered the most difficult and complex by students of navigation. However, if one carefully follows the very clear explanations which Capt. Knight has made by means of his illustrations and diagrams and without the use of a single superfluous word, he will be astonished how simply and how readily the position of a ship may be determined by this method.

The next article will be one of the most interesting of the series and will cover the subject of star sights.—Editor.

FIG. 22

A line from the center of the Earth to the center of the Sun passes through the surface of the Earth at a point called the Sun's Geographical Position. This point (the Sun's Geographical Position) is at the intersection of that parallel, corresponding to the Sun's Declination, with that Meridian corresponding to the Greenwich Hour Angle (angular distance west from Greenwich measured in time, —G.A.T.)

FIG. 23

Imagine a cone resting upon the Earth, its axis passing through the Sun's Geographical Position; its apex at the point of intersection, of the line from the center of Earth to the center of the Sun and a line from the base of the cone to the Sun's lower limb; then the circumference of the base will be a Circle of Equal Altitudes.

The angle between a line on the plane of the Visible Horizon, from a point on this circle to the axis of the cone, and a line on the conical surface from the same point on the circle to the apex of the cone, will be the Observed Altitude of the Sun's Lower Limb.

It is evident this is a right cone, and that like conditions prevail at all points around the bases of right cones, therefore the observer of an altitude knows he is on a circle, equi-distant from the Sun's Geographical Position—from any point of which, the same altitude would be observed at any given instant. In other words, he is on a Circle of Equal Altitudes, otherwise known as a Line of Position.

FIG. 24

The method of Saint-Hilaire consists of finding the Azimuth and calculating the Altitude (Circle of Equal Altitudes) of the Sun for an assumed position, for instance, the Dead Reckoning Position; then laying off from this assumed position to a point along the line of the Azimuth found, the difference (Altitude Difference) in minutes of arc (nautical miles), between the calculated altitude (Calculated Circle of Equal Altitudes); and the observed altitude (Observed Circle of Equal Altitudes) toward the Sun if the observed angle is the greater, or away from the Sun if the observed angle is less than the calculated angle.

A line at right angles (the Circle of Equal Altitudes so found) to the line of Azimuth at the point indicated by the Altitude Difference is the observer's Line of Position.

EXAMPLE

FIRST STEP—Tabulate All Data

1. Date, September 10, 1918. (Ship at anchor.)
2. Assumed Position, Lat. 28° 15′ N. Long. by D.R., 15° 25′ W. (A noon sight was taken and Lat. found.)
3. Height of eye, 30 feet.
4. Chronometer correction, C.C. + 1^m 52^s.
5. Chronometer minus watch, C—W, 1^h 2^m 20^s.
6. The observations and watch time of each.

Obs. Alt. ☉	46° 29′ 40″	at	W.T.	2^h 27^m 25^s
Obs. Alt ☉	46° 28′ 30″	at	W.T.	2^h 29^m 24^s
Obs. Alt. ☉	46° 26′ 30″	at	W.T.	2^h 32^m 11^s
3)	138° 84′ 40″		3)	6^h 88^m 60^s
Mean Obs. Alt. ☉	46° 28′ 13″.3	at	W.T.	2^h 29^m 40^s

SECOND STEP

FIG. 25, 25a

Get the corrected altitude of the Sun (h).

From table 46 Bowditch in column marked 30 feet and in line with 45 (the nearest altitude to ours) in the Obs. Alt. column take out the amount found + 9′ 47″. Apply the

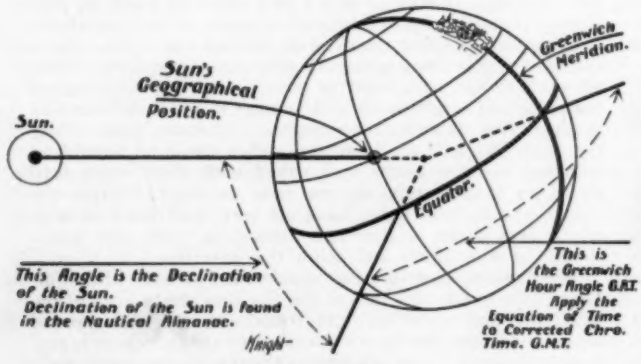

Sun's Geographical Position.
Sun.
Greenwich Meridian.
Equator.
This Angle is the Declination of the Sun.
Declination of the Sun is found in the Nautical Almanac.
This is the Greenwich Hour Angle G.A.T.
Apply the Equation of Time to Corrected Chro. Time. G.M.T.
Knight

Fig. 22.

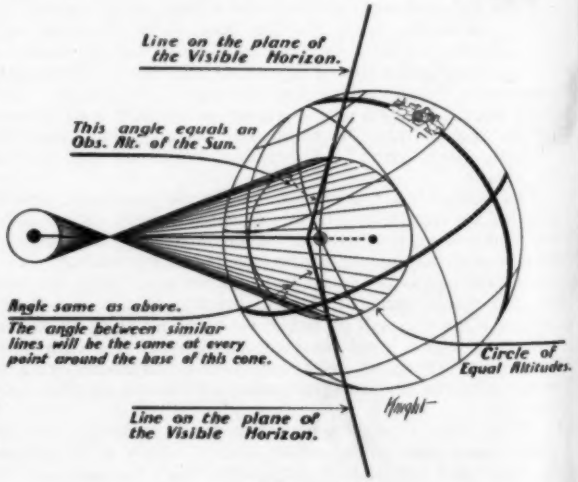

Line on the plane of the Visible Horizon.
This angle equals an Obs. Alt. of the Sun.
Angle same as above.
The angle between similar lines will be the same at every point around the base of this cone.
Circle of Equal Altitudes.
Line on the plane of the Visible Horizon.
Knight

Fig. 23.

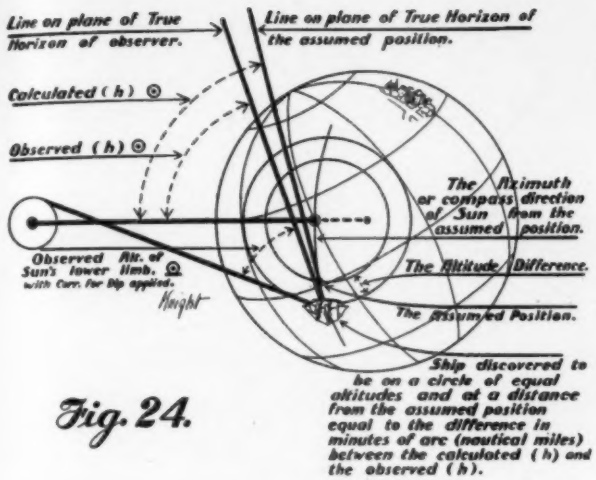

Line on plane of True Horizon of observer.
Line on plane of True Horizon of the assumed position.
Calculated (h) ⊙
Observed (h) ⊙
The Azimuth or compass direction of Sun from the assumed position.
Observed Alt. of Sun's lower limb. ⊙ with Corr. for Dip applied.
The Altitude Difference.
The Assumed Position.
Ship discovered to be on a circle of equal altitudes and at a distance from the assumed position equal to the difference in minutes of arc (nautical miles) between the calculated (h) and the observed (h).
Knight

Fig. 24.

additional correction from the table at bottom of page for the half of month including our date — 5″ thus

	+	9′	47″
	—		5″
	+	9′	42″ Mean Dip, Ref, Par, and Semidiameter cor.
Obs. Alt. ⊙		46°	28′ 13″.3
Corr.	+		9′ 42″
h ⊙		46°	37′ 55″.3

THIRD STEP

Get the Greenwich Mean Time (G.M.T.) as explained in last issue.

Watch time, W.T.	2h	29m	40s
Chro. minus watch C—W	1h	2m	20s
Chro. time	3h	32m	00s
Chro. Corr. C.C. +		1m	52s
G.M.T.	3h	33m	52s

FOURTH STEP

Get Greenwich Apparent Time (G.A.T.) and Declination (Dec.) as explained in last issue.

G.M.T.	3h	33m	52s	Eq. t for 4h and date +	2m 52s.6
Eq. t, +		2m	52s.15	H.D. for ½h —	0s.45
G.A.T.	3h	36m	44s.2	Eq. t for 3½h +	2m 52s.15

Dec. for 4h and date +	5°	5′	.3
H.D. for ½h +			0′.45
Dec. for 3½h +	5°	5′	.75

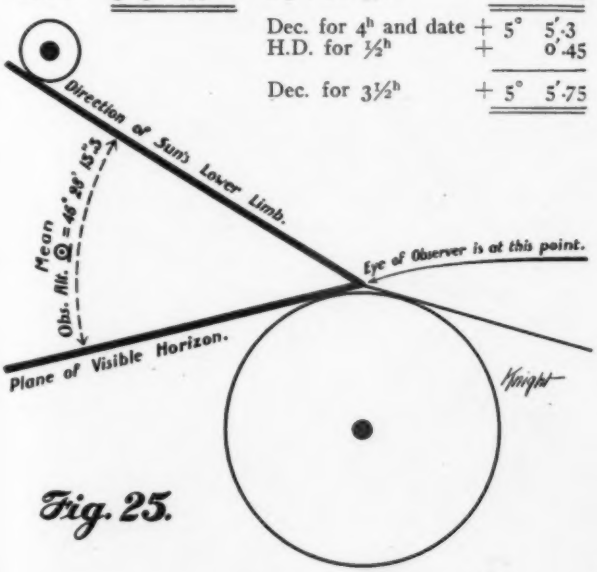


Fig. 25.

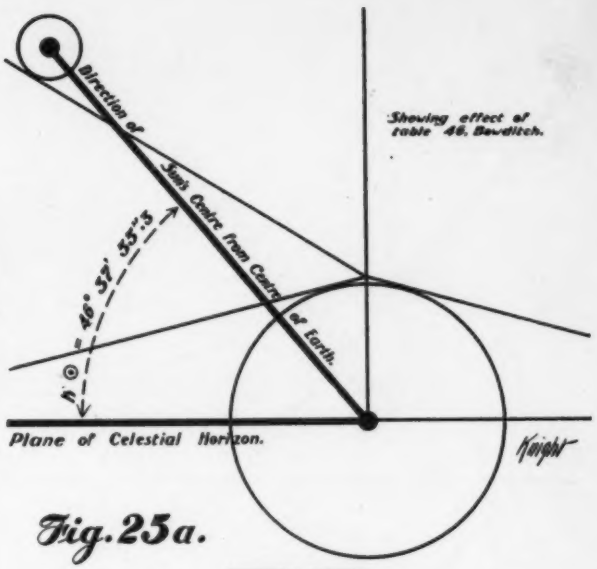

Direction of Sun's Centre from Centre of Earth.
Showing effect of table 46, Bowditch.
46° 37′ 55″.3
h ⊙
Plane of Celestial Horizon.
Knight

Fig. 25a.

FIFTH STEP

Get the Local Apparent Time (L.A.T.) previously explained in last issue.

G.A.T.	3h	36m	44s.2	
λ	1h	1m	40s	equals 15° 25′ w.
L.A.T.	2h	35m	4s.2	equals t

SIXTH STEP

FIG. 26

Having the necessary parts, proceed to computation. Of several formulae the following is most in use. The Cosine Haversine Formula.

Part 1

Hav. t Cos. Lat. Cos. Dec. = Hav. θ. Use Log. functions.

Part 2

Hav. θ + Hav. (Lat. ~ Dec.) = z. Use natural functions. The sign (~) means get the angular difference. Subtract the less from the greater or add if necessary.

Part 1

t	=	2h	35m	4s.2	Log. Hav.	= 9.04198
Lat.	=	28°	15′		Log. Cos.	= 9.94492
Dec.	=	5°	5′	45″	Log. Cos.	= 9.99828
					Log. Hav. θ	= 8.98518

Part 2

	Nat. Hav. θ	= .09665
Lat. ~ Dec. 23° 9′ 15″	Nat. Hav.	= .04027
	Nat. Hav. z	= .13692 = 43° 26′ 5″, the Calculated Zenith Dist.

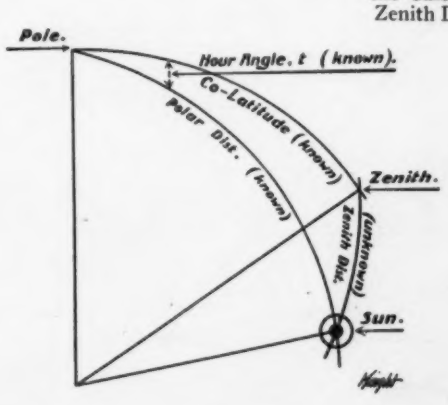


Fig. 26.

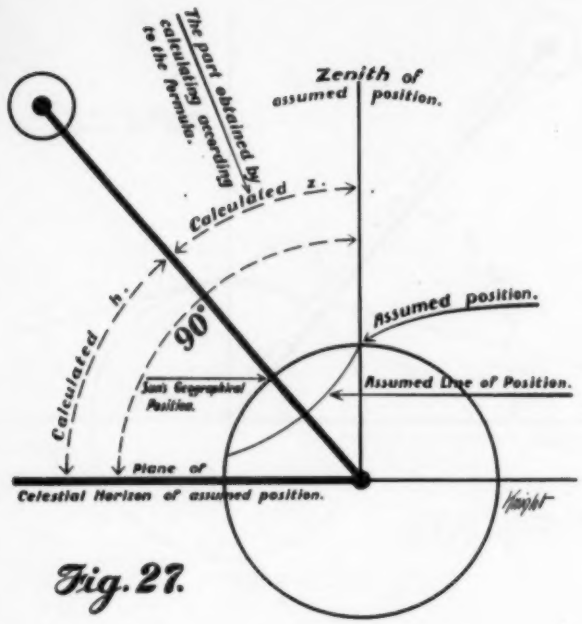


Fig. 27.

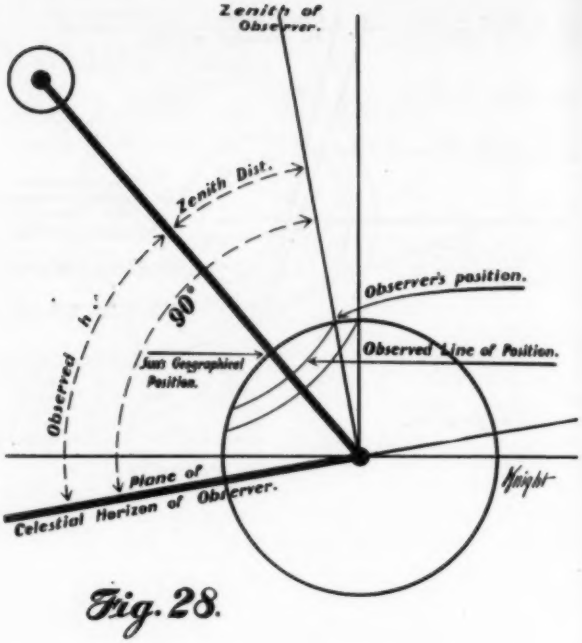


Fig. 28.

The method of using table 44 in Bowditch having been explained in the Time Sight article, we shall let the reader refer to it for help in getting the Cosines of this formula. Haversines are found in table 45 Bowditch.

1. Log. Hav. t, $2^h\ 35^m\ 4^s$.

In column marked Log. Hav., under $2^h\ 35^m$ and in line with 4 in seconds column at left of page, take out the Log., 9.04198.

2. Log. Hav. θ 8.98518, must be changed to a Nat. Hav. θ.

Search the table; you will find 8.98520 to be the nearest, and immediately next to it in heavy type, in column of Nat. Hav. take out the Nat. Hav., θ .09665.

3. Nat. Hav. Lat. ~ Dec.	Lat.	28°	15′	
	Dec. —	5°	5′	45″
Lat. ~ Dec. =		23°	9′	15″

Nat. Haversines are given for every 15″ of arc, corresponding to one second of time. In column under 23° and in line with 37 seconds of time (which equals 9′ 15″ of arc) take out the Nat. Hav., .04027.

4. Searching the table for Nat. Hav. .13692, we find in column under 43° 15′ and in line with 11′, .13691 to be the nearest. The next Hav. is .13694, thus the difference of three equals 15″ therefore our difference of one equals 5″.

Consequently	43°	15′	
+		11′	
+			5″
43°	26′	5″	= Calculated z

SEVENTH STEP

FIG. 27

Get the Calculated h,

	90°	00′	00″
Calculated z	43°	26′	5″
Calculated h	46°	33′	55″

90 degrees minus the calculated Zenith Dist. equals the calculated Altitude, which is the h of the assumed position.

(*Continued on page* 60)

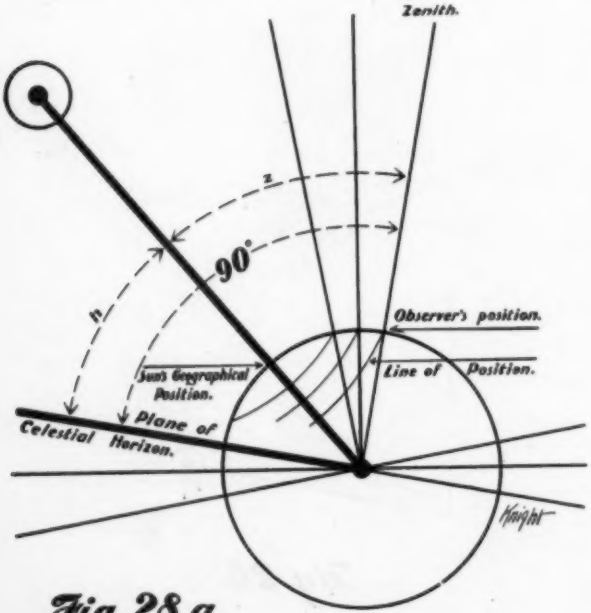


Fig. 28 a.

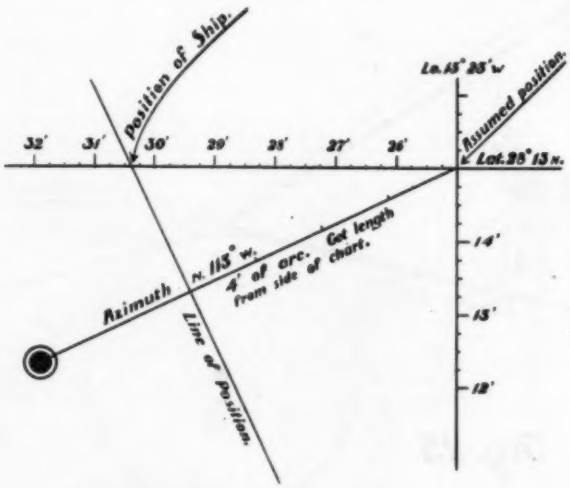


Fig. 29.

Knight

My Ideal Auxiliary

No. 3, Bonita—A 25-Foot Ketch

By Howard A. Pike

The "My Ideal Auxiliary" Competition is open to every amateur of the country. There are no other restrictions and no limit to the size or type of the auxiliary which the designer may choose as his "Ideal". Designs may be submitted any time up to May 15, 1919, but the earlier they are received, the better chance the designer has to have them published. The plans should be complete and include outboard profile, arrangement plans, sections, construction, details, lines, and a table of offsets. A description of not over 2,500 words should accompany the plans.

For each design published we will pay $35 and to the winner of the series will be presented $65 worth of boat merchandise of the winner's choosing. MoToR BoatinG's subscribers pick the winner.

"I'LL tell you what, fellows, believe me, if I ever own another sail boat she will have a kicker installed below and then the wind can fall flat all it pleases."

I well remember that remark and many others which went out over a flat sea as we lay becalmed late one afternoon off Point Judith aboard a pretty slick sail boat bound for Newport, R. I., after having made a fine run that morning from New Haven, Conn.

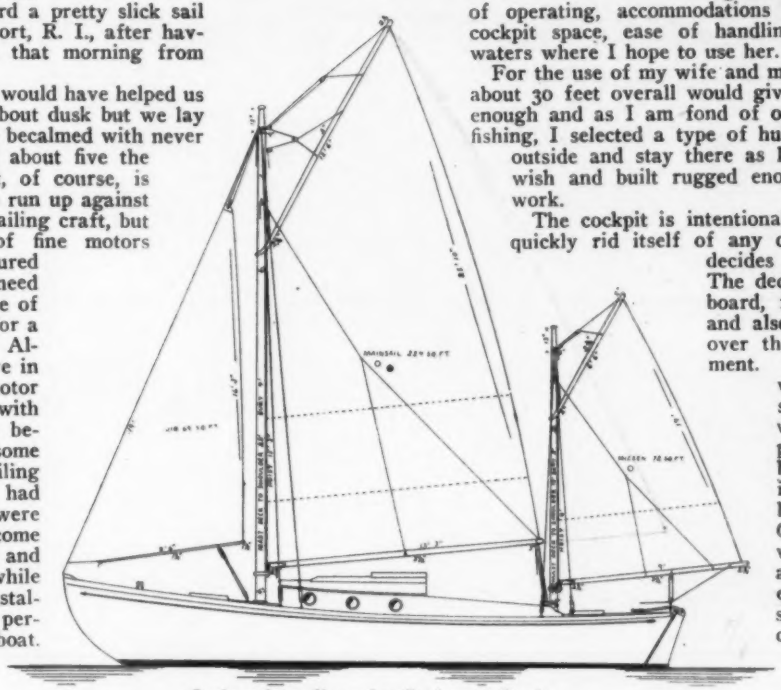
Now a motor below would have helped us to make our port at about dusk but we lay off the Point all night becalmed with never a breath of air until about five the next morning. That, of course, is what we all expect to run up against if we own a strictly sailing craft, but with the numbers of fine motors which are manufactured today we no longer need to lie becalmed outside of some harbor, hoping for a breeze to take us in. Although I firmly believe in the sail boat with motor installed, designed with that intention in the beginning, I have seen some fine examples of sailing craft which have had motors put in, which were never intended to become a part of the outfit and have made good while lots of other motor installations have spoiled a perfectly good sailing boat.

A properly designed auxiliary is nearer the ideal.

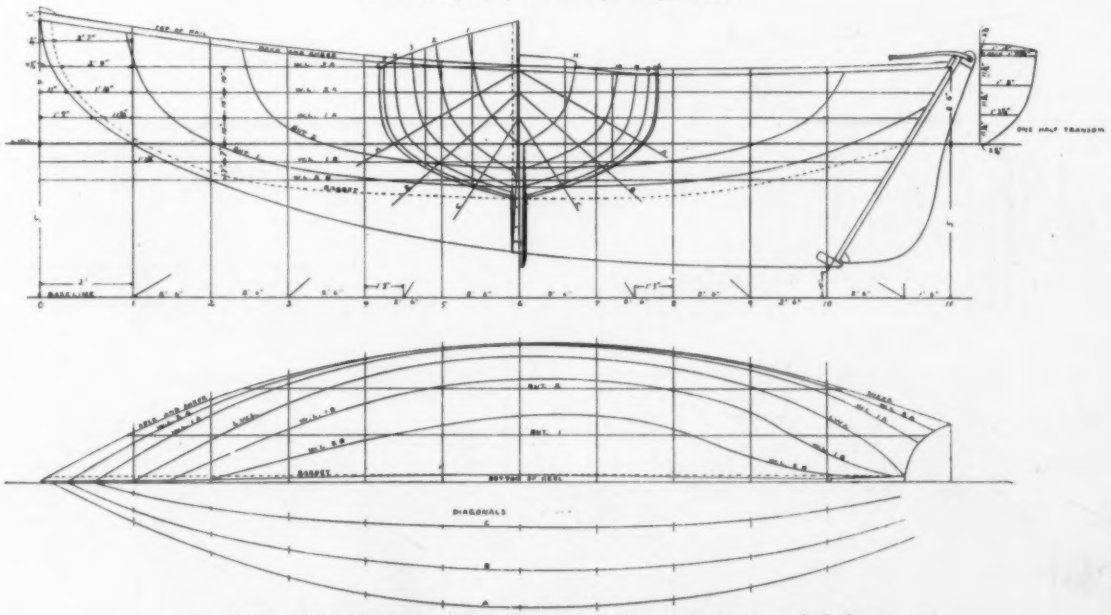
From the day that I made the remark about the kicker I have had in mind the sort of auxiliary I would like to own and the plans printed in this article are surely my ideal auxiliary as first considering the cost to build, cost of operating, accommodations below, deck and cockpit space, ease of handling alone and the waters where I hope to use her.

For the use of my wife and myself I found that about 30 feet overall would give us a boat large enough and as I am fond of outside sailing and fishing, I selected a type of hull which could go outside and stay there as long as one could wish and built rugged enough to stand the work.

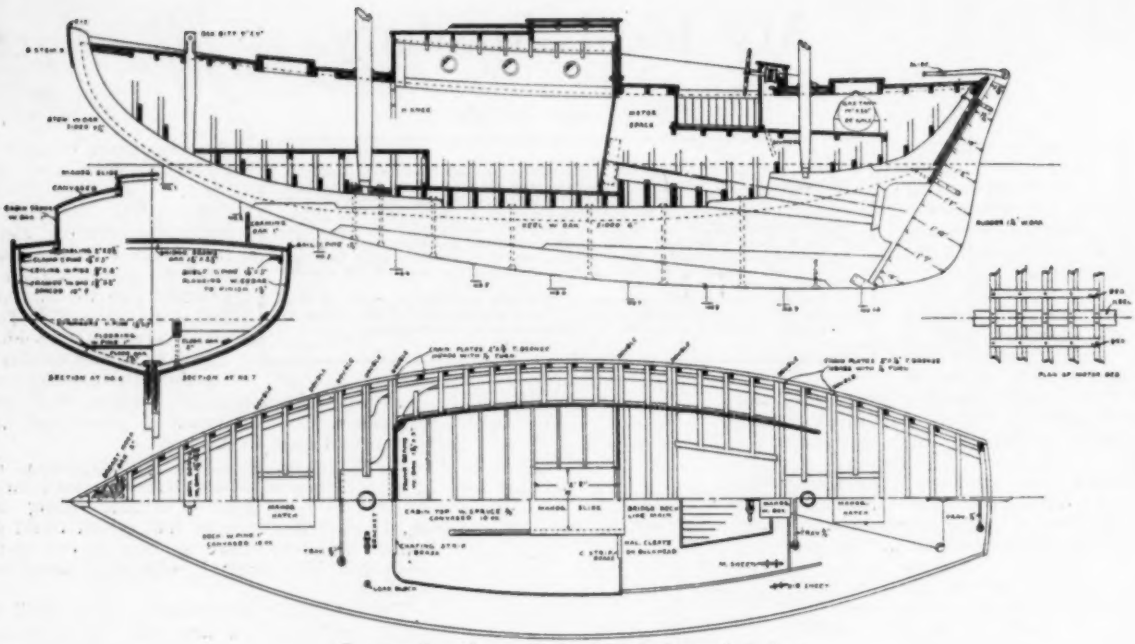
The cockpit is intentionally made small to quickly rid itself of any old comber which decides to come aboard. The deck is extended inboard, forming the seats and also the bridge deck over the motor compartment. The sail plan, while small for a sail boat, is just what I want and practically all inboard, and seldom if ever will there be need to reef it. On the other hand, when I fail to get a breeze strong enough to use the sails alone, a two-cylinder, 10 h.p.



Outboard profile and sail plan of Bonita



Lines of the 25-foot auxiliary Ketch. Scale: 3/16 inch equals 1 foot



Construction plans. Scale: 3/16 inch equals 1 foot

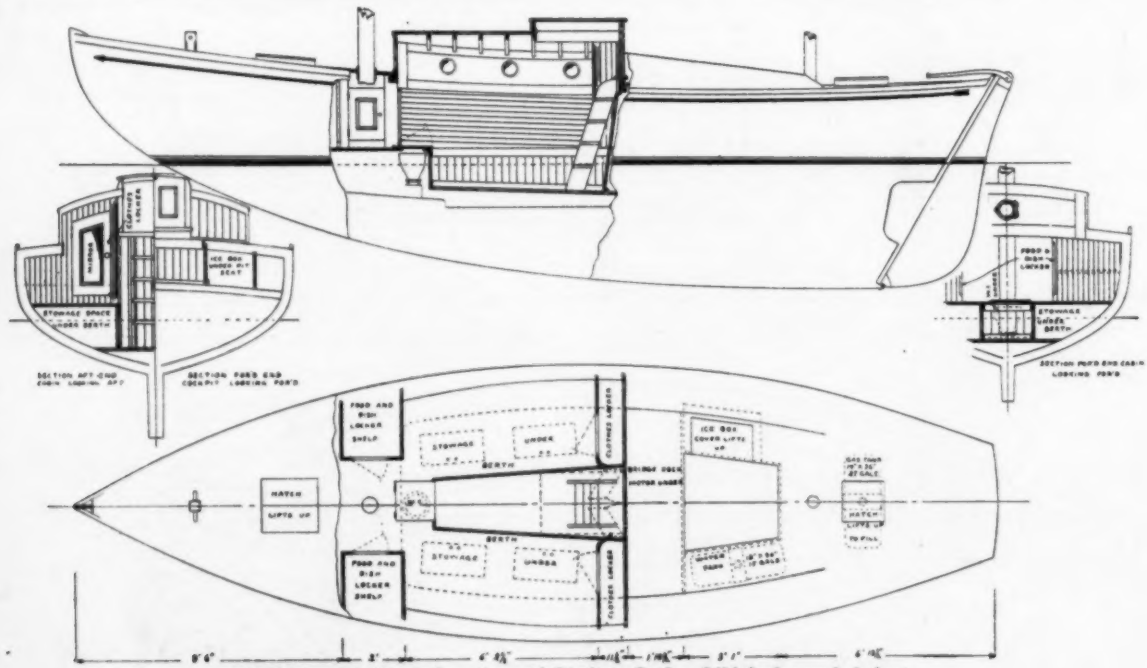
Frisbie motor will kick her along at about 7 miles per hour and maybe more. This motor is installed so as to be out of the cabin, but also readily accessible when wanted.

I think the plans are complete enough to convey my ideas without going into a detailed story of the boat. They are the result of many years of experience in handling and cruising in sail boats (*Continued on page 68*)

OFFSET TABLE 25' W. L. AUX. KETCH "BONITA"

Stations / Heights	Stem	1	2	3	4	5	6	7	8	9	10	11
Sheer	9. 0.0	8. 6.7	8. 2.6	7.11.0	7. 8.2	7. 6.2	7. 4.4	7. 3.2	7. 3.0	7. 3.0	7. 3.6	7. 6.0
Rabbet	.....	5. 2.2	4. 1.0	3. 7.0	3. 4.6	3. 3.4	3. 2.6	3. 2.6	3. 3.4	3. 7.6	4. 2.4	.....
Keel Bot	.....	5. 0.0	3.10.0	2.11.2	2. 3.4	1. 9.6	1. 5.4	1. 2.4	1. 0.6	1. 0.0	1. 0.0	.....
Half Breadths												
Deck and Sheer	.....	1. 7.4	2. 8.0	3. 5.4	4. 0.2	4. 3.4	4. 6.0	4. 5.1	4. 2.4	3. 9.4	3. 2.0	.....
W. L. 3-A	.....	1. 5.6	2. 7.2	3. 5.2	4. 0.1	4. 3.4	.....	.....	.....	.....	.....	.....
W. L. 2-A	.....	1. 3.3	2. 5.3	3. 4.2	3.11.6	4. 4.4	4. 6.0	4. 5.2	4. 2.0	3. 8.6	3. 1.0	.....
W. L. 1-A	.....	0. 9.7	2. 2.0	3. 2.0	3.10.2	4. 3.4	4. 5.4	4. 4.2	4. 0.2	3. 6.6	2.10.0	.....
L. W. L.	.....	.....	1. 5.3	2. 0.4	3. 4.4	3.10.2	4. 0.4	3.11.6	3. 7.6	3. 1.0	2. 0.4	.....
W. L. 1-B	.....	.....	0. 8.0	1. 9.3	2. 6.6	3. 1.2	3. 3.6	3. 3.0	2.11.4	2. 3.0	0.10.0	.....
W. L. 2-B	.....	.....	.....	0. 8.6	1. 4.2	1.10.2	2. 1.4	2. 1.0	1. 8.5	0. 9.4	.....	.....
	Face											
Keel Bot	0. 0.4	0. 0.4	0. 0.6	0. 1.4	0. 2.0	0. 2.4	0. 2.6	0. 2.4	0. 2.0	1. 0.4	0. 1.0	.....
Diagonal A	.....	1. 5.4	2. 7.4	3. 6.4	4. 2.0	4. 6.4	4. 8.2	4. 7.4	4. 4.3	3.11.0	3. 2.4	.....
Diagonal B	.....	1. 2.0	2. 2.6	2.11.4	3. 5.0	3. 8.2	3. 9.5	3. 9.0	3. 7.4	3. 3.0	2. 7.0	.....
Diagonal C	.....	0. 7.4	1. 6.6	2. 1.5	2. 5.0	2. 6.7	2. 8.1	2. 8.0	2 6.5	2. 3 0	1. 8.0	.....

Dimensions given in feet, inches and eighths to outside of planking.



Arrangement plan and sections of Bonita. Scale: 3/16 inch equals 1 foot

Miami Opens the Racing Season

Good Speed Made in a Series of Races for Displacement Boats and Express Cruisers Sanctioned by the American Power Boat Association

Photograph Copyrighted by International Film Service

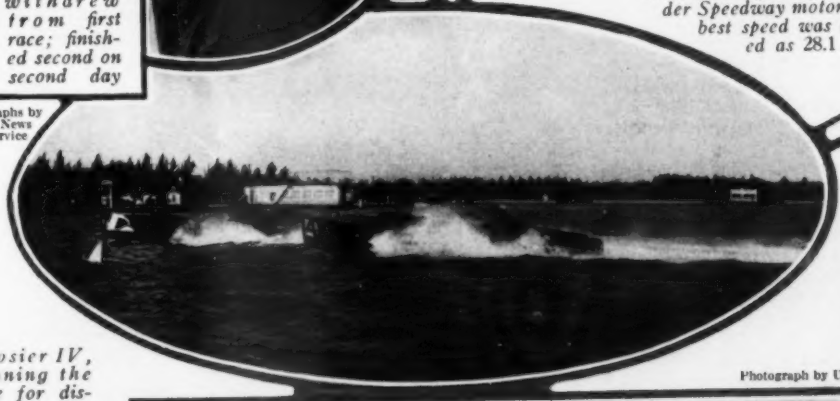
Start of the class for Displacement Racers

Hoosier II, withdrew from first race; finished second on second day

Photographs by Central News Photo Service

Whip, owned by Mr. R. E. Maypole, of Chicago, wins the express cruiser race. This boat is powered with a pair of six-cylinder Speedway motors. Her best speed was reported as 28.1 m.p.h.

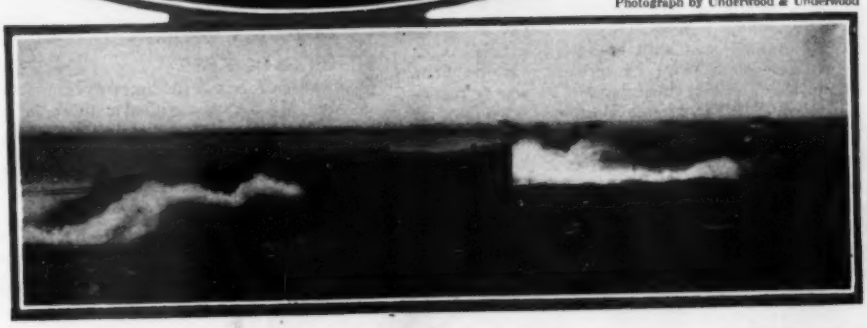
Photograph by Underwood & Underwood



In the race for express cruisers Altonia and Whip were sistership, both powered with Speedway motors. Whip by getting the best start and drawing the pole position was able to hold the lead in both days' races

Hoosier IV, winning the race for displacement racers at a speed of 28.5 m.p.h. for the 10-mile race. This boat is powered with a 130-145 h.p. Sterling motor. In her half-mile speed trials she averaged 34.55 m.p.h.

Photograph by Underwood & Underwood



War Service Record of American Yachtsmen and Motor Boatmen

A Brief Resumé of the Service Seen by Many Officers and Men Who Acquired Their First Love of the Water Aboard Small Motor Boats in Peace Times

(*Continued from the February and March issues of* MoToR BoatinG)

Machinist's Mate Harold J. Gahn

BEING a "Motor Boat Bug," as he expresses it, Chief Machinist's Mate Harold J. Gahn picked the Naval Reserve Force as the best branch of service for himself, and was fortunate enough to be assigned to one of Uncle Sam's best gasoline motored patrol boats for the entire duration of the war. He enlisted as a machinist's mate, first class, being later advanced to chief. He was made engineer officer of S. P. 666, U.S.S. Natoma, a craft powered with two six-cylinder Speedway engines and having an approximate speed of 14 knots.

This vessel was assigned to patrol duty around the light ships at the entrance to New York habor, and for eighteen months was keeping the restricted areas clear of small pleasure and fishing boats so that the troopships could move unheeded. Natoma rescued and towed safely into port seventeen disabled airplanes, and on one occasion Machinist's Mate Gahn volunteered to dive under a sinking army plane, to make a line fast to her crankshaft so that she could be raised and towed into port.

Natoma also rescued survivors of some torpedoed vessels and did a great deal of convoy duty and was always on the lookout for submarines, but never had the luck to sight one. Chief Gahn was one of those who was anxious to get overseas, but was always told that somebody had to guard our own shores, and with those others who were forced to remain over here realized in time that he was doing his bit in the way the Navy Department wanted him to.

Ensign Harry Grafton

LATE in February Ensign Harry Grafton, of Brookline, Mass., was still in foreign waters, and his father, H. C. Grafton, was not expecting him back for some time. Young Grafton joined the Naval Reserve Force in June 1917 and received his commission as ensign in August 1918 at Newport, R. I. Orders followed almost immediately for him to go to Brown University as Executive Officer and aide to Rear Admiral Edwards, in charge of the Brown Naval Unit. From there he was transferred to the destroyer Breese, on which vessel he went abroad.

Edgar T. Wareing

THE supreme sacrifice was made by Edgar T. Wareing, of Albany, N. Y., who after a prolonged period of illness died while in his country's service June 23, 1918, at the Naval Hospital in Pensacola, Fla. Young Wareing had enlisted in the Naval Aviation in December 1917, giving up a position with the Albany Builders and Supply Company and reached the Naval training camp at Pensacola January 2, 1918. He had always been in excellent health up to the time he joined the service, but after only two weeks in camp and while in a draft of men destined for Philadelphia and eventually overseas, he contracted German measles. While convalescing he was attacked with spinal meningitis, and after pulling through that had typhoid fever, which developed into double pneumonia, from which he died.

He was the son of Thomas and Anna M. Wareing and was born May 7, 1887, in Albany, where he received his education and later entered the employ of the H. A. Dwight Building Supply Company. Later he was with the Pratt Lumber Co., at Binghamton, N. Y., which place he left to join the firm he was with at the time of his enlistment. He was a member of the Albany Yacht Club, Mount Vernon Lodge No. 3, F. & A. M.; and Elks Lodge No. 49 and was an attendant of All Saints Episcopal Cathedral.

The Ottawa Power Boat Association

SIX members of the Ottawa Power Boat Association, of Ottawa, Ont., served Canada with unswerving fidelity and a singleness of purpose that reflected not only high credit upon themselves but upon their yachting organization as well.

Enlisting at the age of nineteen years Howard Hardy served in the Motor Patrol, and had so won promotion that at the time the armistice was signed had been in command of a mine sweeper in the North Sea for some time, although only twenty-two years of age. E. D. K. Matthews, who went over early in the war, was in command of a large vessel also.

R. E. Sproule after reaching England was transferred to the Coastal Motor Boat Patrol, operating against Zeebrugge in 40-foot racing hydroplanes equipped with 300 h.p. motors. W. H. Lanceley, A. Latham and H. Sunderland also served with distinction.

Ensign J. G. Breaznell

INTERESTING work in convoy duty as Assistant Engineer Officer on the cruiser Galveston fell to the lot of Ensign J. G. Breaznell, of the Naval Reserve Force. Ensign Breaznell was sent to the Galveston April 1, 1918, and has remained aboard that warship ever since. Many trips across were made guarding merchantment and troopships, and this young officer says that he will always have much to remember about the United States Navy.

The Mitchell Brothers

THE Mitchell brothers, of Yonkers, N. Y., both felt the call of the Navy, which they explain was quite natural since both had been devoted yachtsmen in ante bellum days.

Walter B. Mitchell enlisted in the Naval Reserve Force in May 1918, receiving the rating of chief boatswain's mate, and shortly thereafter was sent to the Officers' Training School, at Pelham Bay, and was commissioned an ensign November 21, 1918.

Frank J. Mitchell enlisted in the Naval Reserve Force July 5, 1917, on the receiving ship Granite State and two days later was transferred to U.S.S. Charleston, on which vessel he cruised in the waters of the United States and to Guantanamo and Havana, Cuba, Panama, and Bermuda. On November 5, 1917, he was transferred to U.S.S. Astoria and made a cruise to Biloxi, Miss., and Charleston, S. C., and then to Brest, France, where he arrived in February 1918. He was engaged in patrol duty in French waters from that time until the armistice was signed.

Arthur C. Larson

HAVING always been inclined to the water Arthur C. Larson of Norwich, Conn., a former member of the Chelsea Boat Club, entered the Naval service April 30, 1917, with, as he expresses it, "a firm resolution to make a chum out of 'Uncle Neptune'". But was one of those seamen who never saw the sea. He spent several months in training at the Naval Station, Newport, R. I., after which he was transferred to the Naval Experimental Station at New London, Conn., where he was still located when the armistice was signed. As the nature of his work was in experimenting with anti-submarine devices, he was unable to tell anything about his duties.

Ensign C. Willard Evans

THE Naval Reserve Force attracted Ensign C. Willard Evans, of San Francisco, even before war was declared, and Mr. Evans enrolled with rank of ensign on March 3, 1917. Three days later he was called to duty as enrolling officer of the Motor Boat Section, continuing this duty as general enrolling officer until November 14, 1918, when he was assigned to U.S.S. Sequoia. He was released from active duty January 4, 1919.

Ensign Evans is chairman of the California Section of the American Power Boat Association, a member of the San Francisco Yacht Club and the Pacific Motor Boat Club.

More Yachtsmen Who Fought in the War

Ensign Harry Grafton, of Brookline, Mass., enlisted in the Naval Reserve Force in June 1917. Late in February he was still in foreign waters

Lieut. George F. Newton, Jr., who enlisted in the Naval Service in February, 1917, has seen service in all the American as well as European waters. On September 21, 1918, he was made assistant to the Harbor Supervisor at Brest, and is apparently to remain there for some time

Lieut. Ashley D. Adams who enlisted as Chief Quartermaster was later commissioned Ensign and finally Lieutenant j. g., after his return from the war zone

Lieut. Schuyler Dillon, of Boston, Mass., has just returned home after spending several months on board U.S.S. Sacramento doing patrol and convoy work in the Mediterranean

Machinist's Mate L. W. Mowry received his training at Bensonhurst and Pelham Bay. He was then transferred to Kwasind on which boat he saw several months of hard sea duty

Chief Yeoman Benjamin L. Duncan has been stationed since his enlistment at the Fore River Shipbuilding Wks, Quincy, Mass. He is a prominent member of the Quincy Yacht Club, of Quincy, Mass.

James M. Shuck, of Los Angeles, Cal., is a member of one of the well-known yacht clubs on the Pacific Coast

Machinist's Mate G. F. Neuberger enlisted in the U.S.N. Aviation R.F., and was trained at Charleston, S. C.

Fireman J. Eyre, a member of the Belleville Motor & Yacht Club, enlisted in the navy at the beginning of the war

How the Diesel Engine Proves In

(Continued from March Issue)

PART IV

By Herbert Haas

IN the previous issues of MoToR BoatinG Mr. Haas described how in a few instances and for some purposes the Diesel engine is replacing gas and gasoline engines declaring that it insured a more efficient utilization of petroleum and coal-tar products, when using heavy liquid fuels such as cannot be utilized in other types.

There are three general types of liquid fuel engines, he explains, one in which the entire fuel charge is sprayed against a highly heated surface in a chamber connected with the working cylinder, termed "explosion oil engines" a second type in which the fuel to be converted is finely subdivided by air, and in this state of atomization is injected directly into the engine cylinder; this is the Diesel engine; and the third type in which features of the others are combined, in which the fuel is burned at both constant volume and constant pressure known as the Sabathé engine.

Mr. Haas explained the four-stroke cycle and the two-stroke cycle Diesel engines and explained the difference between these and the Sabathé engines, going into the comparative advantages of the cycles, asserting that in theory that for a given cylinder size and speed, the specific duty of an engine having a two-stroke cycle is double that of an engine having a four-stroke cycle, but that in practice, however, these advantages are not so apparent.

The small Diesel engines of European countries and the larger ones more commonly in use in America were contrasted with an explanation of the economies of Diesel and of oil explosion engines. Vertical Diesel engines were elucidated with explanations as to the construction of cylinders and cylinder frames, the construction of the crankshaft, methods of lubrication, the main bearings, pistons, and he was explaining the flywheel, which is continued in the present issue.

MAKING allowances for the different classes of power service that Diesel engines have to perform, manufacturers usually provide standard light, medium, and heavy flywheels for all engines, the medium and heavy flywheels of smaller engines being also available as light and medium flywheels for progressively larger machines. The set of flywheels used on one-cylinder engines is also used on multi-cylinder units with cylinders of same size.

One- and Two-Cylinder Units

One-cylinder units should not be used if the permissible variation has to be less than one-fiftieth; two-cylinder units may be used if the factor of irregularity does not have to be less than one-hundredth; one two-hundredth is the limit for three cylinder units, and one-three-hundredth or less for four-cylinder units.

Limitations as to weight and dimensions of engine and flywheel, floor-space requirements, the more perfect balancing of the much-reduced reciprocating masses, and the great compactness will often decidedly favor the multi-cylinder unit, especially when the Diesel engine is to be directly connected to an alternating-current generator and two or more units are to operate in parallel.

Fuel Valves

Next to the fuel pump, the fuel-injection valve is the most important and characteristic part of a Diesel engine, and on its correct construction greatly depends the satisfactory operation of the engine. It performs two distinct functions. First, it has to admit the liquid fuel into the engine cylinder at the proper time, and must therefore be an accurately timed valve. Second, it has to introduce the liquid fuel into the cylinder in a completely atomized form, and must therefore be an efficient atomizer.

The first requirement is fulfilled by storing around the tip of the fuel needle a drop of oil, which is forced ahead of the injection air into the heated atmosphere of the engine cylinder at regularly recurring intervals, and thus initiates the ignition. The second requirement is accomplished by dividing the fuel supply into numerous small fuel particles in the fuel valve, preceding atomization and injection.

In the atomizing nozzle of the fuel valve a part of the pressure of the injected air is changed into velocity, which reaches its maximum at the orifice of the nozzle. Owing to the expansion of the air at the orifice there is a decided drop in temperature at this point, where the ignition of the fuel is to be initiated. This localized lowering of the temperature at the nozzle orifice is accentuated during periods of low load, when the fuel supply is diminished proportionately to the engine load, whereas the injection air supply remains constant, that is, the same as at full load, because the fuel-valve needle stays open during 10 to 15 per cent. of the stroke of the engine, irrespective of the load. The relation of fuel supply to air supply is therefore changed with a change in load. It is consequently more difficult to initiate the ignition at partial than at normal engine loads. A correctly designed fuel valve must be so constructed that unfailing fuel ignition at the proper instant will take place for every working impulse. Moreover, the atomization and injection of the fuel must be gradual during the entire period the needle valve is open.

Preheating of the injection air to counteract a cooling effect during fuel injection not only constitutes an element of danger owing to possible fuel ignition in the fuel valve, but results in an uneven, knocking operation of the engine as a result of explosion-like ignition of the fuel.

Starting Engine with Gas Oil

To permit the burning in Diesel engines of coal-tar oils (a by-product of cooking and gas works operations and a distillate of coal tar), two methods have been used. One is to start the engine with gas oil and after it has become hot change to tar oil. The governor and the fuel pump are so designed that with a lowering of the load the fuel is changed to gas oil and vice versa. This method has the disadvantage of causing an unnecessarily large quantity of gas oil to be consumed if the engine works a large part of the time at fractional loads.

In another system separate fuel pumps are used for the gas oil (also referred to as ignition oil, because it initiates the ignition) and the coal tar or tar oil. The two oils are stored separately in the fuel valve, the ignition oil being so placed around the edge of the end of the valve needle that it will always enter the combustion space first, and thus initiate the ignition. The fuel is injected with compressed air as in the other valves previously described. The proportion of gas oil to tar oil used varies with the load. At no load the gas oil amounts to as much as 20 per cent. of the tar oil; at quarter load it drops to 15 per cent., at half load to less than 10 per cent., at three-quarters load to 4 per cent., and at full load and at overload to about 3 per cent. During average operating conditions the consumption of gas oil seldom exceeds 10 per cent., and is usually 7 per cent. The combined fuel consumption, on a basis of heating value, is nearly the same as if only gas oil were used. Both pumps are, of course, under the influence of the engine governor. The nicety and sensitiveness of this highly successful process may be realized from the fact that the volume of gas oil injected ahead of the tar oil is exceedingly small.

If the fuel oils, tar, or tar oils are highly viscous and do not flow readily to the fuel pump and to the fuel valve and resist atomization, gas oil is used to start the engine and run it until hot, and the hot discharge water from the engine jacket is used to heat the viscous oil to increase its fluidity. This system requires a separate small tank for the gas oil, in addition to the one used for the viscous fuel oil, and the pipe system must be so arranged that either fuel can be supplied to the fuel pump. When the engine is to be shut down, the gas oil should be switched on and the engine operated on gas oil until all of the viscous oil has been displaced. This arrangement works satisfactorily except when the operator forgets to change over to gas oil before stopping the engine or in the event of an unforeseen sudden shutdown owing to some engine trouble. These contingencies are so rare that separate fuel pumps and pipe systems for the two kinds of fuel are seldom provided.

The methods of using tar oils described are of no immediate importance in the United States, where an abundant

supply of petroleum products (gas oils and residues) is cheaply obtainable, and coal tar commands relatively higher prices. In Europe, particularly Germany, petroleum residues and gas oils are expensive, and the abundant supply of tar oils from by-product coke ovens and coal gas-works justifies their use by the method outlined.

Methods of Actuating Valves

The usual method of actuating the valves of vertical engines is through a system of rocking levers and cams. The governor, usually of the through shaft type, is mounted on the vertical shaft, as this has the higher speed. This arrangement permits the use of a smaller governor of the standard type. Governors for horizontal engines are driven from the lay shaft, which also operates the valve gear. This shaft runs at half the speed of the engine shaft in engines having a four-stroke cycle. The governor is therefore speeded up through a set of spur gears, so that a smaller size can be used.

The engines are provided with a barring mechanism for turning the cranks into starting position. It is also necessary to pump by hand or by other means to force a small quantity of fuel oil into the pipes leading to the fuel valves, so that the engine will fire quickly.

When the air receivers are placed on the engine-room floor separate from the engine, the operator, if only one is present, will have to mount the engine platform for making the different valve shifts as well as step down to open or close the valve of the air receiver.

To make possible the performance of this work from the engine-room floor, including the simultaneous engaging or disengaging of all of the starting valves or fuel valves, a system of auxiliary cams is used, controlled centrally from the engine-room floor. This system also permits holding the exhaust valves open during a part of the compression stroke to save compressed air in starting. By shifting the auxiliary cams out of action the regular cams come into play when the engine is running on fuel.

In one construction the air receivers for the air used in starting and injecting the fuel are attached to the front of the engine, being mounted sufficiently high so that the air-receiver valves can be operated and all other movements directed from the engine platform. With this arrangement the accessibility of some parts of the engine suffers somewhat.

In another construction mechanically operated starting valves are eliminated, independent air-operated piston valves being substituted. These receive the starting air through a rotary distributor operated by the camshaft. The rotary distributor can be connected or disconnected when the engine is running or is at rest. The fuel valves likewise are thrown in by a central control. This construction eliminates the cam and the fulcrumed lever for each starting valve used with the other types.

As a rule only one or two cylinders of a multicylinder engine are provided with starting valves, thus reducing the cost of the engine. In some engines automatic means are provided for keeping the exhaust valve open during starting, compression being avoided until the engine is well up to or past its normal speed to save compressed air in starting. Some horizontal engines have a blow-off cock in the end of the cylinder, which is kept open for a time in starting; this is also used to blow off accumulations of dirty and spent cylinder oil.

As the exhaust valves soon become fouled with carbon, they have to be ground often, and it is desirable that they be readily removable without disturbing the valve-lever operating gear and the fulcrum shaft.

To avoid long shutdown of the engine, a spare exhaust valve with cage is kept on hand, which is slipped into the place of the one removed. The frequency with which exhaust valves have to be removed depends greatly on the nature of the fuel burned; fuels with high ash and coke content will foul the exhaust valves more rapidly. Although engines can be operated continuously for several weeks, the usual practice is to stop an engine for about an hour weekly, and remove the exhaust valve and fuel needle of one cylinder. The valves and needles of the other cylinders are removed in rotation each week. The valves are removed regardless of their condition merely to keep the engine at its highest efficiency.

When the scavenging valves of two-cycle engines are placed in the cylinder head, the four valves are operated in pairs; and each yoke (or valve pair) is actuated by a system of double rocking arms, so fulcrumed as to form a parallelogram which serves to actuate all four valves simultaneously and to open each valve an equal amount.

The time at which the different valves are opened and closed differs widely with different makes of engines.

The air valves open 10 to 29 deg. before the piston reaches the top dead center, and close 15 to 20 deg. past the bottom center, being open a total period of 210 to 220 deg.

The fuel valves open 2 to 8 deg. before the piston reaches the top center, and close 18 to 36 deg. after the piston has passed the top center, being open 20 to 44 deg.

The exhaust valves open 25 to 45 deg. before the piston reaches the bottom center, and close 8 to 14 deg. after the piston has passed the top center.

The angle of lead is least for slow-speed engines and greater for high-speed marine engines of moderate power (100 to 200 h.p.; 400 to 600 r.p.m.). This angle makes allowance for the inertia of the valves; the type of fuel valve and the properties of the liquid fuel burned also influence the timing of the fuel valve.

The reliability of the fuel pump and its sensitiveness in responding to the slightest variations in load largely determine the satisfactory operation of the Diesel engine. The pump must respond to the governor instantly and must furnish a supply of fuel accurately proportioned to the needs of the engine load. The permissible variations have to deal with extremely small volumes of fuel.

We may distinguish between pumps that do not have to force the fuel against the high pressure of the injection air but supply the fuel to open nozzles, and pumps that must deliver the oil against the injection air in closed-nozzle valves.

Pumps of the first type have to work against little resistance—merely that due to pipe friction and the low lift from pump to fuel valve; the oil supply can therefore be regulated with close accuracy by varying the stroke of the pump plunger, which is under governor control.

Pumps of this type are simple, work well, and are subject to little wear. When they are working under low pressure, the stuffing boxes are easily kept tight and give no trouble. They respond readily to the governor, and accurately adjust themselves to the smallest load variations.

In a fuel pump, driven by an eccentric on the lay shaft, the plunger is of the differential type, the upper or larger part being hollow and having seated at its upper end a cut-off valve. The plunger has a full positive stroke with each revolution of the lay shaft. The cut-off valve is under direct control of a Jahns governor. Governing is effected by permitting the cut-off valve to seat at a pre-determined point in the upstroke of the plunger, thus delivering to the fuel valve a quantity of oil, correctly proportioned to the load that the engine is carrying.

Pumps Designed to Force Fuel Against High Pressure

Pumps of the other type have to be designed to withstand safely the maximum pressure against which they have to deliver the oil, namely, 1,000 pounds per square inch. They have to force the oil into the fuel-valve chamber, which is under the pressure of the injection air that varies from 600 to 1,000 pounds per square inch. Pumps of this type have to deal with extremely dense and correspondingly sluggish liquids.

For this reason no attempt is made, in pumps of this class, to place the pump plunger under governor control and to regulate the fuel-oil supply by varying the stroke of the pump plunger in proportion to the fuel required by the engine. The high pressure under which the plunger has to work would react on the governor with each stroke, affecting its precision unfavorably and demanding a more powerful governor. There is also the possibility that air may be drawn into the plunger barrel during the suction stroke; with the minute quantities of oil to be delivered to the engine, especially at partial loads, a small air bubble may displace all the oil, and as air is an elastic medium, may be compressed and expanded and seriously interfere with the functioning of the governor.

To avoid these difficulties the pump plunger works with a constant stroke, furnishing a supply of oil exceeding the maximum quantity required by the engine when working at full load.

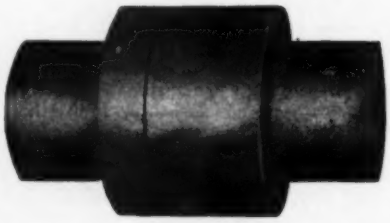
(To be continued)

New Things for Motor Boatmen

Each month new parts, attachments, and fittings, interesting and invaluable to owners of large and small motor boats, are added to the devices already on the market. Announcements of these articles come to us in such numbers that in order to introduce all of them to our readers we have been obliged to omit descriptions and publish only illustrations with short explanatory captions. In doing this, however, we urgently invite our readers to write us for complete information, as we shall take the greatest pleasure in providing it, together with the name and address of the manufacturers from whom the products may be obtained.

Uniflex couplings the manufacturer calls them. They operate in either direction; can be made self-adjusting for wear, extra shock absorbing and without backlash. Two shaft members and a set of blocks comprise the coupling. The shaft members are simply jawed hubs adapted to engage each other through the blocks

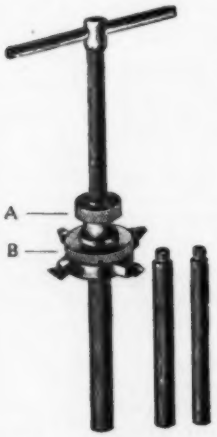
Drop-forged wire rope sockets fill a void in the life of almost every motor boatman, particularly when the sockets are intended to grip quarter-inch rope. They come in weldless closed pattern, or may be had in the open pattern, drop-forged and without welds



The single-button switch is the successor to the present two-button or turn-button switch, thus eliminating the two-operation movement to turn on the current. If the current is required to be turned on and off consecutively the operator does not take his finger off the one button

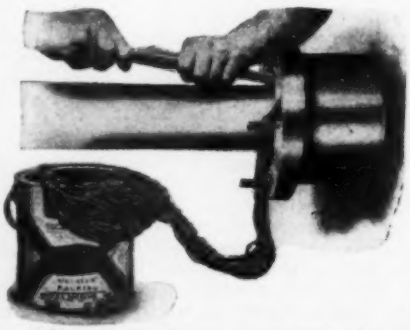
A hand tachometer which has only one spindle for all three ranges which are engaged by simply shifting the thumb-slide while the object under test is running. The greatest advantage of hand tachometers is that they are absolutely "dead beat" to a degree which the manufacturer claims has been hitherto unattained by any other similar instrument

This seat folds compactly and can be stowed away under bow or stern deck of any skiff or motor boat. It adds comfort and style to any craft. As rustproof as good plating or japaning can make it. The hook slips under the seat, holding it securely in place

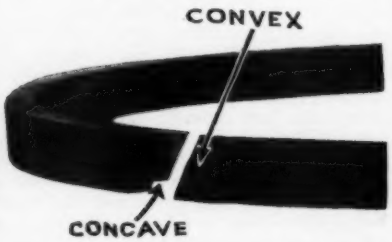


This is a simple valve seating tool. To adjust it, it is only necessary to turn lock nut A to left one-quarter turn which releases adjusting washer B until the required diameter is obtained, after which lock nut A should be securely tightened down on adjusting washer B which will hold cutters rigid

This piston ring is of the concentric type, gas-tight even though the cylinder wall may wear. This is due to the peculiar construction of the ends which are so made that wear does not alter their ability to maintain a perfect joint. The ends of the ring overlap. The outer overlap is concave and the inner overlap convex



Here is a fibrous metallic packing in long flexible strands which are readily separated and twisted into any size needed. The manufacturers claim it will not fuse or become hard under 600 per cent, is easy to apply, will not create friction, will give long service and is meeting a long felt want



Do not fail to write to the editor if you desire information concerning any of the above new things

Orienta Yacht Club's War Work

THE psychology of sport and the psychology of war are akin; and it is interesting to note how naturally the young yachtsmen of 1916 answered their country's call a year later. They went to the war in the spirit they went to the races, and put into the one the keenness, pluck, and initiative they had put into the other.

The war record of the Orienta Yacht Club illustrates this kinship of war and play. When war was declared, the club had a membership of 160; and of those 51 (or 31 87/100 per cent! went into the service. The club's "Honor Roll," of which it is justly proud, is given herewith. It shows that the racing men and boys, those whose boats, in fair weather and foul, crossed the starting line in every race at the western end of the Sound, joined the Navy, while those interested in the shore activities of the club went into the Army.

All of the available boats of the fleet were offered to the Government. This is the Commodore's boat which was accepted by the Navy Department

The grounds and equipment were turned over to the Junior Naval Reserve and members loaned their boats so the boys could receive practical instruction in seamanship

While its young men thus did their part, the older members did theirs. The few available boats of the fleet, the clubhouse and its grounds, were offered to the Government.

The only boat accepted was the Avallon, belonging to the present Commodore E. J. Lascaris. She was at once taken to Bridgeport, where she was manned by men from the club.

The clubhouse and grounds were tendered to the Navy as a patrol station; but as a more convenient location was found at Whitestone, the offer was declined.

The Red Cross, Liberty Loan, United War Work, W. S. S. and other committees used the clubhouse until the end of the war. In fact all of the war drives made the house their administrative center

The house was then turned over to the Red Cross, which used most of it for workrooms till the end of the war. The rest of the house was used as the headquarters of all patriotic activities; and the committees of the Red Cross Canteen, Liberty Loan, United War Work, War Savings Stamps, Legal Advisory Board, in fact, all of the war drives made the house their administrative center.

The club grounds near the water were given to the Junior Naval Reserve for camping purposes; and members loaned their boats so the boys could receive practical instruction in seamanship and elementary navigation.

The clubhouse and grounds were tendered to the Navy as a patrol station

Obviously, the use of the club by its members for recreation purposes ceased altogether during the war; but this small sacrifice made by the men too old for active service makes a fitting background for the roster of those who offered their lives to their country.

ORIENTA YACHT CLUB HONOR ROLL

Charles H. Beckley, K. C. Brennecke, (F) Mary B. Brooks, John Chapman, Jr., G. G. Fry, G. G. Fry, Jr., A. Van Gaasbeek, Harry Gedney, Herbert Gregg, James Haggerty, John Haggerty, W. P. Herdman, Eugene F. Humphrey, John H. Koffman, Rossiert Maurice, Stewart Maurice, Pierre Mosser, R. B. Savage, James Turner, Charles W. Anthes, George V. Bates, F. J. Bister, Swepson J. Brooks, Alfred J. Brown, Barrett Brown, *Clarence J. Bull, Dr. Cantle, Mervin H. Connor, H. C. Engle, J. Findley, Lewis Gatley, Austin Gedney, Charles F. Griffen, Howard Harvier, J. G. Hollerith, I. J. Imperatori, C. E. Lakema, O. H. Murray, Beresford Proctor, Gordon Proctor, W. G. Roeder, R. G. Simpson, Clarence Shrenkeisen, H. L. Slade, G. H. Throop, Aylmer Thompson, Raymond Titus, Jas. S. Whitham, G. W. Whitham, Chas. Williams, Fred Wilson. *Killed in action.

Yard and Shop

Notes of Interest to Both Owner and Manufacturer

All Motor Boats Must Be Numbered

In accordance with a law recently passed by Congress all motor boats of less than 16 tons gross burden must carry a number on each bow of not less than 3 inches in height. Every owner must apply in person or by mail to the Collector of Customs of the district in which the owner lives for a number to be assigned to his boat. A number will thereupon be assigned by the Collector of Customs for which there will be no charge to the owner. The owner must then either paint the number assigned to him on each side of the bow of his boat or he may attach metal numbers if he so chooses. No particular style or type of number is required.

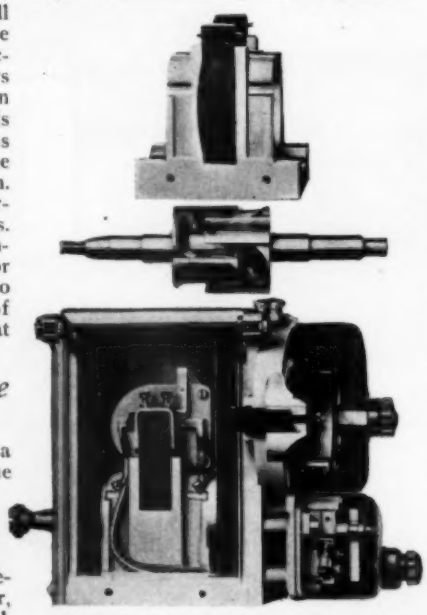
The W. H. Chapman Co., of Middletown, Conn., have designed a very neat and effective number especially for motor boat numbering which passes all requirements of the law that they are selling for thirty cents a number up, according to whether the owner prefers brass, bronze, nickel or gold. As in most of the customs districts a letter is being assigned to the motor boats as well as a number in order to keep the number of digits down to a minimum. The company is also prepared to furnish the letters as well as the numbers. Each set of numbers furnished is complete with all necessary screws, etc., for attaching to the bows. We know of no neater or more economical method of complying with this new motor boat numbering law.

After-the-War-Work at the Speedway Shops

In anticipation of a demand for a model stock cruiser which will meet the requirements of that large class of persons who possess moderate incomes the Gas Engine & Power Co. and Chas. L. Seabury & Co., Cons., of Morris Heights, N. Y., have designed and constructed a 52-footer, splendidly built and splendidly equipped, equally well adapted for coastwise cruising and inland sailing. Comfortable accommodations with a private stateroom for the owner, which is the big feature of the boat. Of course, there are the other usual features, including a handsome dining salon and livable crew's quarters.

The Seabury people have followed the policy of building standardized boats and the results have been very gratifying. The new model was produced by the designers of the plant keeping up with the latest ideas, together with the trend of popular opinion among yachtsmen. In bringing forward this model, C. G. Amory, treasurer of the company, said it was the wish of his firm in developing this stock model to offer to the yachting world a comparatively small cruising motor boat in a small length, giving many of the advantages and comforts of the larger cruisers at a moderate cost. This craft has a beam of 11 feet 4 inches, a draft of 3 feet and a speed of 14 m.p.h.

Victoire, the largest gasoline driven submarine chaser produced in this country has been completed by the Seabury plant and is now at the Brooklyn Navy Yard fitting out preparatory to sailing under its own power for France. Launched a few days after the signing of the armistice, this craft, 130 feet over all, has the appearance of being quite a large craft when compared with the 110-footers used in the American Navy. The hull is of steel construction of similar weight of the average torpedo boat. She is to mount two 3-inch guns, one forward and one aft. The power plant consists of three Speedway heavy-duty gasoline motors of 250 h.p. each, an auxiliary air and generating set, and an independent electric light set. The engine-room is large and there is plenty of light and ventilation. The test showed 19¼ m.p.h., with the engines operating at 450 r.p.m. This was with a full load, including all equipment and weight aboard for guns, ammunitions and stores. This speed is said to be the fastest attained in this type of submarine chaser.



Dixie magneto showing working parts. The only parts that ever require adjustment are the interrupter points, and these may be filed flat and clean with a manicure file or a special magneto file
Top-Field structure. Center-Interrupter mechanism

Commercial work is also occupying much of the effort of the Morris Heights plant. Some of this is work contracted for during the war which has not been finished while a part of it is new work.

Cancellation of the work on the flying boats made it necessary to break up the gang of boat builders who were at work on that contract when the armistice was signed and the part of No. 2 building formerly used for flying boat construction is now being utilized as a mold loft. Work of laying down Hull No. 242 is under way there at present.

Generous Advertising Forces Lockwood-Ash to Expand

Spectacular leaps in the demand for Sterling spark plugs and an upward slant of the sales curve representing Lockwood-Ash marine engines have resulted in new factory quarters for the Lockwood-Ash Motor Co., of Jackson, Mich., writes the company.

The Lockwood-Ash company is one of the oldest and best known makers of marine engines—and more recently the manufacturer of this remarkably successful spark plug.

The present Lockwood-Ash plant is at South Jackson and Douglass streets, on a four-acre tract located to the very best advantage from a shipping standpoint, with its own railroad siding, and every modern feature contributing to better working conditions and more rapid production.

Within the last year the sales of Sterling plugs have gone sky-rocketing coincident with a broad advertising campaign. In fact, sales had run so far ahead of production up to the time the change in location was effected that new business offered could not be accepted.

But with the addition of new batteries of screw machines and other equipment, spark plug production has been more than doubled, with much more room to grow in the present buildings. And there is plenty of space to build as the scope of the business widens.

Within the factory buildings the most modern facilities for promoting good workmanship are provided—plenty of light and air, progressive assembly, better stockroom arrangement and improved welfare conditions as relating to employes.

The Lockwood-Ash Motor Company was established nearly twenty years ago. Twelve years ago the company began making spark plugs for their own product.

With the opportunity of watching the development of spark plugs in their own engines, the company was able to go more thoroughly into the fundamentals of spark plug construction. Today the factory is perhaps the only one which builds the spark plugs for its own engines.

Berling Magneto Adds to Its Executive Personnel

Preparing for its after-war-development and the big business which it believes is in prospect, Berling Magneto has added a number of prominent executives to its forces and made several important changes, at a sales conference recently held.

In addition to the appointment as engineering manager of Roger Chauveau, former Chief of Division of Ignition,

Production and Inspection of the Bureau of Aircraft Production during the war, the following additions to the sales organization were announced:

Lee C. Carlton, well known in the ignition field, has been appointed district manager of the Midwest district, with offices in the Century Bldg., Chicago, Ill.

G. R. Nauth has been put in charge of the Michigan and Ohio territory, with headquarters in Detroit.

Another addition to the sales organization is H. C. Anderton, who was formerly sales manager of the John O. Heintze Co., of Springfield, O., and who during the war has been district chief engineer in charge of the Dayton district for the Bureau of Aircraft Production.

H. E. Walker, who has represented the manufacturers of the Berling Magneto for the last three years, occupies the position of New York district manager, with offices at 51 East 42 St., New York City.

At the conference further proposed steps of progress were outlined by W. C. Berling, vice-president and general manager.

Luders Builds New Type Boat

Seaplane barges, a new type of boat designed by the Navy Department for use as "floating garages" for the hydroaeroplanes of the Navy, were constructed by the Luders Marine Construction Co., of Stamford, Conn., during the war and were towed to the other side of the Atlantic Ocean and put into active service over there. Four of these barges were built by the Luders people under their Navy contract and had not hostilities ceased so abruptly many others would undoubtedly have been ordered as the boat was found entirely practicable and well suited for the purpose for which it was made. These boats were of the V-bottom type, 60 feet in length with a beam of 16 feet. They had a slipdown back and were made so that the stern could be submerged and the hydroaeroplane floated right off or on as the case might be. They worked somewhat on the principle of dry docks by taking water into their tanks to submerge and let the plane off and blowing it out to allow the barge to rise again.

The Luders plant was extremely busy with other war contracts and all of this work has not finally been completed. Four tugs for the Navy Department started June 1 are keeping all hands occupied. One was delivered in March, and the other three are to be delivered three weeks apart. These boats are 88 feet long, have a beam of 21 feet and a draft of 8 feet.

For the Army the Luders company built twelve 61-foot launches, known as Q-boats, since they are being used by the Quartermasters Corps. These craft were from Luders design and are in operation as tenders around various forts. They were powered with Frisco Standard engines of 60 h.p. Two of these boats made the trip from the Luders plant at Stamford to New Orleans under their own power and in all of them not a single untoward incident has been reported.

Of the 110-foot chasers, the Luders company built five, and of these, three were sent to France under their own power where they were constantly in service, one being officially credited with a submarine. Twelve yachts were altered to make them practicable for patrol boats. Kemah, a 146-foot yacht which the Luders people completed a year ago, was commandeered by the Government.

For the Brazilian government two launches were built after the Luders concern had been recommended for the work by the Navy Department of the United States. One of these launches is to be used on the Brazilian Dreadnought Sao Paulo, now undergoing alterations at the Brooklyn Navy Yard.

Larger Quarters for Bruns, Kimball & Co.

Because of the demand for space made necessary by their rapidly increasing business, now that the war is over, Bruns, Kimball & Co., of 115 Liberty St., New York, have leased the buildings 153-155-157-159 West 15 St., a place where the firm will have three or four times as much floor space as in the old location.

The store floor (ground floor) has a show window front of 85 feet on 15 St., and 110 feet deep. This together with another floor in the same building makes a display room of over 18,000 square feet. This is without a doubt one of the largest marine engine display rooms known, and could be termed a continuous marine engine show. In the lists of engines this firm advertises, most all of which are on display in their show room, our readers can appreciate that these motors together with the large stock of new Sterling, Kermath, Doman, Burnoil, Gray and Prior, and Universal four-cycle engines as well as a large stock of Hartford and Eagle two-cycle engines, that each interested person can surely find an engine to suit his requirements by calling at this enormously large display room which will be open for business in April. Bruns, Kimball & Company advise that special deductions will be made to our readers for prompt purchase of goods on hand, to save the expense of moving them to the new quarters. Readers will also receive prompt replies to letters asking for particulars as to these engines.

Caywood and Brogan Join Black & Decker

The Black & Decker Mfg. Co., of Baltimore, makers of portable electric drills and electric air compressors, have announced that D. G. Caywood, formerly sales manager of the Brunner Mfg. Co., of Utica, N. Y., has joined them in the capacity of special representative to carry on the field work in the distribution of the Black & Decker specialized products. Mr. Caywood was among the first to see the possibilities of the electric air compressor and has been actively engaged in this field for the last fifteen years.

Another addition to the Black & Decker forces is Graham W. Brogan, former advertising manager of the Duesenberg Motors Corp., who is now handling the publicity of the Baltimore firm. Mr. Brogan has had a wide experience in the motor boat field, having an enviable record of success behind him and his personality has already made itself evident in the publicity of Black & Decker. Mr. Brogan is a man of original ideas and his services have been much sought after by live firms.

Tripp Secures Bureau Ruling on Numbering

After a vigorous correspondence with the Bureau of Navigation covering several weeks, L. L. Tripp, president of the Albany Boat Corp., of Watervliet, N. Y., has secured a ruling from the Department of Commerce, through the Bureau on the use of a manufacturer's license number for motor boats. Mr. Tripp took up with the Department the necessity of boat builders having a license number bearing the word Manufacturer on a plate or board and placed on new boats during testing or delivery period for the purpose of identification. It was intended by Mr. Tripp that this should serve the same purpose as the dealer's or manufacturer's number serves in the case of automobile licenses.

The Commissioner of Navigation took the matter up with the Collector of Customs of New York after the receipt of the correspondence from Mr. Tripp, and the Collector wrote the Commissioner as follows:

"Upon further consideration this office perceives no objection to awarding separate numbers to manufacturers provided such numbers are distinctive and will be used only during the testing of the boats or their delivery to the ultimate owner, and that the place upon which the number will appear will have marked thereon immediately above the number the word Manufacturer. In awarding such numbers in this district a number greater than those normally used would be awarded; for example, such numbers would commence with 'K10,001,' the normal number not exceeding 9,999."

Acting Commissioner A. J. Tyrer, upon receipt of that letter from the New York Collector wrote Mr. Tripp, saying:

"In accordance with that letter you may apply to the Collector for a number to be used on a boat under construction in your yards while on its trial trip, it being understood that any boats owned by you will be awarded their own numbers and that the number which is awarded to you by the Collector of Customs will be used only in the case of boats you are building prior to their being turned over to the persons for whom they are built, such persons to make applications for their own numbers. Your attention is invited to the fact that there is no fee connected with the awarding of these numbers."

Clay Engine Co. Appoints New Agents

The constantly expanding business of the Clay Engine Co., of Cleveland, O.,

builders of Honest Clay heavy-duty marine motors, has caused the appointment of new agencies to cover certain territory more intensively. Sutter Bros., of 30 Church St., New York City, have been appointed the New York distributors; Walter H. Moreton, of 214 State St., Boston, has been made distributor for the New England district and Arthur Duvic, of 130 Charters St., New Orleans, has been named agent for the Louisiana district. With the appointment of these new agencies the company looks forward to a far better service to assist patrons than it has hitherto been able to render.

A. J. Schwarber, formerly export manager for the Ferro Machine & Foundry Co., of Cleveland, has been added to the Clay forces as export manager, with offices at 2 East 23 St., New York City. In this connection the Clay people state that the concern is now in full operation in the greatly enlarged plant with five times its former equipment and facilities and are ready to make immediate shipments on all orders.

Improvements on Dunn Motors

An increasing demand for Dunn motors following the addition of certain improvements to their engines is announced by the Dunn Motor Wks., of Ogdensburg, N. Y., builders of four-cycle motors. This concern builds gas engines in six sizes from a single-cylinder to a six-cylinder 24-h.p. motor. The crank rods of these motors are now made of steel, with bushings at both ends of genuine phosphor bronze. This alloy becomes glazed rapidly by wear and has a very low co-efficient of friction. The firm agrees to replace any of these free of cost in case of breakage within a year from purchase.

On multiple-cylinder motors the company is using an elevated timer driven by miter gearing from the camshaft. It is equipped with separate water jackets, readily detachable and a very simple heater which utilizes the heat of the exhaust for vaporizing the fuel for all cylinders, thus enabling the user of this motor to operate on either gasoline or kerosene. This device is bolted directly to the heads, and permits kerosene to be used without smoke or carbon deposit. The crankshaft of bar steel, sawed cold, is one of the strongest parts of the motor and is of ample proportions. It runs in babbit bearings and provision is made for taking up wear.

Crosby and Neidermair Join Hands

William F. Crosby, who was for a long time associated with Whitaker in the yacht and engine game, has formed a partnership with J. C. Neidermair, N. A., under the firm name of Crosby & Neidermair, and will take up the designing and brokerage of yachts. The junior partner is a graduate of Webb Academy, and is assistant chief of the Scientific Section of the Hull Division of the Brooklyn Navy Yard. Both members of the new firm have been highly trained in the technical side of both yacht and ship work and are especially proficient in engine and motor work.

Magneto Principles and Magneto Care

Since magneto ignition is practically universally used in motor boats because of need for absolute reliability and efficiency, the boat owner should become more familiar with the fundamental principles of magneto operation. It is not generally known that there are in use today magnetos of two definite types of construction, one with revolving armature and one with stationary armature, or rotary pole, and that there are distinct reasons for this difference of engineering opinion.

The modern magneto of whatever type requires little attention. Anyone familiar with electric generators of any type knows that a periodic oiling of the armature or moving shaft bearings is all that is required. In the magneto there are ball bearings for the moving element and these must be oiled like any other bearings, an oil well or oil hole being provided in every instrument. There is provided also an oil hole or well for parts of the interrupter mechanism. The only parts that ever require adjustment are the interrupter points and these may be filed flat and clean with a manicure file or a special magneto file. A magneto that gets these attentions three times a year and the oiling at the intervals stated by the maker, will be free from any serious troubles. Cleanliness is important as it is in the operation of any apparatus but in the magneto of today practically all parts are dust-proofed. However, an occasional cleaning of the distributor board with a clean cloth slightly moistened with oil, helps toward maintaining perfect ignition.

Navy to Sell Motor Boats April 17

We are advised by the Navy Department that eight of the motor boats which they took over for war purposes will be offered for sale on April 17, 1919. These are all well-known motor boats powered with motors of standard make. The boats are as follows:

Length Ft.		Power
Nerita	106	Two six cyl. motors
Polly	57	Two 70 h.p. motors
Aurore II.	96	Two 180 h.p. motors
Coronet	90	One 150 h.p. motor
Dodger II.	76	Two 150 h.p. motors
Eagle	80	Two 120 h.p. motors
Ellen	68	Two 150 h.p. motors
Patrol No. 5	40	One 135 h.p. motor

The boats will be sold at a private sale and sealed proposals will be received at the Bureau of Supplies and Accounts, Navy Department, Washington, D. C., until 12 o'clock noon April 17, when they will be publicly opened. Full information and specifications of the boats may be obtained by addressing the above bureau.

Bartsch Back Again With Bosch

In line with its policy of securing the best possible executive regardless of cost the American Bosch Magneto Company has secured the services of Alfred H. Bartsch as general sales and advertising manager. Mr. Bartsch, who had been for more than seven years the advertising manager of the Bosch company prior to our entry in the war, has for the last two years been located in Philadelphia, where he represented a number of prominent firms of the automotive industries as merchandising and advertising counsel.

Canadian Official Praises Outboard Motor

The advantage of using an Evinrude outboard motor in a trip along the coast of British Columbia was commented upon by the Minister of Lands for the Province of British Columbia who, in his official report, has this to say:

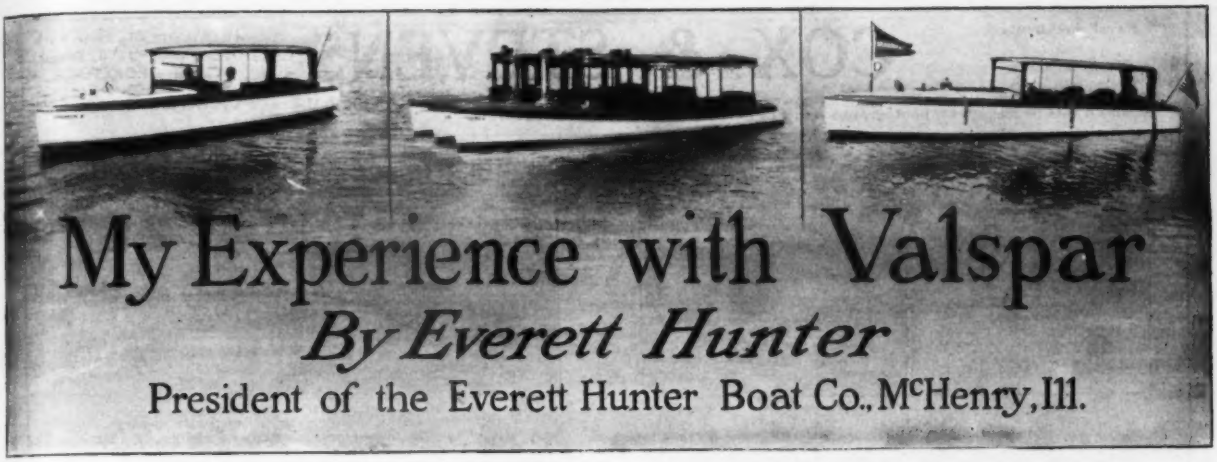
"We were engaged in traversing the coast line of many of the islands, and as the shores are very rocky and precipitous, we, as a rule, had hard work to make a landing if the water was at all rough. When even a moderate sea was running it was unsafe to attempt to make a landing at many points; at such times we would select the most favorable spot and carefully pull the boat up on the crest of a breaker, when at the proper instant one man would make a jump for the shore. Then the operation would be repeated until the whole party was landed. As all these traverses were chained, the chaining frequently required all our ingenuity in coping with the cluffs and with the heavy swell with its shifting load of kelp and seaweed. At one point we were working in a heavy swell which finally caught our five-chain tape and carried away all but a few links at one end. All winter long the shores are exposed to the fury of the winter gales, driving the vegetation back, so that we very seldom had to do any cutting on the shore traverses.

"We use an 18-foot rowboat equipped with an Evinrude engine, which was a very satisfactory combination, as in many places there was no shelter for a boat and we had to pull it up on the rocks, which would have been impossible with a launch. Then, again, we had to cope with tides running as high as 4½ knots, which would have been out of the question had we to depend on oars."

Navy Wants Hospital Apprentices

Hospital apprentices are wanted for enlistment in the Navy now. This corps is open to young men between eighteen and thirty-five years, who have had a grammar school or one year's high school education or the equivalent thereof and even if the high schooling has not been had if the youth shows ability he may enter this corps.

(*Continued on page 70*)



My Experience with Valspar

By Everett Hunter

President of the Everett Hunter Boat Co., McHenry, Ill.

WE have used Valspar Varnish exclusively for the finish of all our high-grade boats the past four or five years with gratifying results. It dries hard over night, which is very desirable when we are in our rush season, as it enables us to get the outfits off our hands.

At first we were very skeptical regarding the wearing qualities of any varnish that would harden so quickly. The writer has been in the boat building business over thirty years and those who know will bear me out

MARTHA & MILLICENT

when I say our earlier teachings on varnish were that it was impossible to get a good wearing varnish unless it was a very slow drier. But Valspar has knocked all this theory into a cocked hat, for surely five years' use of this varnish is sufficient to teach an "old salt" that we were wrong in that belief.

I carefully examined several outfits we turned out with Valspar, and to my amazement at the end of a season's use they came in for storage in the fall in a perfect state of preservation.

PAL-O'-MINE

All of our better work gets at least three good heavy coats on top of the oil filler, and if given time we put on four coats, which is absolutely the very best protection against decay of any varnish we have ever used, and we feel that Valspar is better than ever now, since it appears to have a little heavier body than formerly.

A few of our recent productions are shown on this page.

The three launches taken in a group are 31 ft. long by 7 ft. beam, and powered with 4-cylinder Buffalo engines. Solid mahogany finish.

Antoinette (top left) is a new stock model with us and is the very finest 25 ft. x 5 ft. in. runabout we ever turned out in the round bottom.

Shamrock (top right) is our standard "V" bottom model with the 4 cylinder, 4 cycle model "D" Gray motor with electric starter.

Martha & Millicent is our standard stock model 22 ft. x 5 ft. 9 in. with our own make 10 H. P. 4 cylinder, 4 cycle motor, with electric starter complete.

House Boat *Pal-O'-Mine* is 14 ft. x 30 ft. and is fitted up very fine in quarter sawed oak, state room, dining and living rooms, galley, toilet, screened-in-porches, etc. The toilet, staterooms, etc., are finished in Val-Enamel.

ELJA

Elja is our regular stock 31 ft. "V" bottom and is powered with 6 cylinder Lowe-Victor motor.

All of these outfits are finished with Valspar.

VALENTINE'S VALSPAR
The Varnish That Won't Turn White

Valspar is easy to apply. Send for our little handbook, "How to Use Valspar on Boats." It is full of useful tips on varnishing.

Valspar is sold by paint, hardware and marine supply stores everywhere.

VALENTINE & COMPANY
456 Fourth Avenue, New York

ESTABLISHED 1832—*Largest Manufacturers of High-grade Varnishes in the World*

New York Chicago Boston — TRADE VALENTINES MARK — Toronto London Amsterdam

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Naval Architects and Yacht Brokers

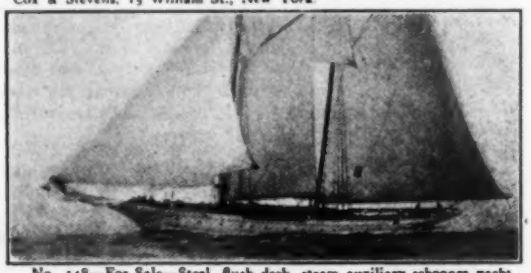
COX & STEVENS

15 William St., New York
Telephone—1375 Broad
Cable—BROKERAGE

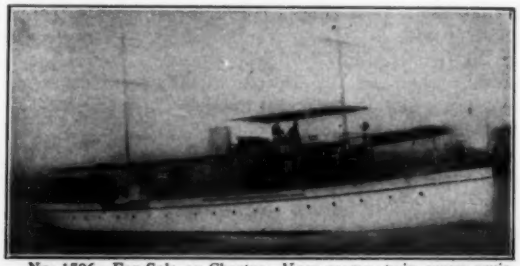
We have a complete list of all steam and power yachts, auxiliaries and houseboats available FOR SALE and CHARTER. A few are shown on this page. Plans, photographs and full particulars furnished on request.

No. 2366—For Sale—Particularly desirable steel, twin screw cruising power yacht; 126 x 18.6 x 6 ft. Recently built in best manner; exceptionally able craft. Speed 12-14 miles; two 125-150 H. P. 6 cyl. air-starting motors. Large deck dining saloon; main saloon, five staterooms, two bathrooms, etc., aft. All conveniences. Handsomely furnished. Cox & Stevens, 15 William St., New York.

No. 3541—For Sale or Charter—Particularly desirable 100 ft. steel twin screw cruising power yacht. Practically in commission; very attractively furnished and finished. Speed up to 15 miles; two 6-cyl. air-starting and reversible Standard motors. Fitted with every convenience. Large dining saloon and social hall on deck; five staterooms, bath, two toilet rooms, etc. Without doubt finest of type and size available. Cox & Stevens, 15 William St., N. Y.

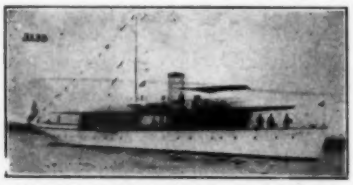


No. 148—For Sale—Steel, flush deck, steam auxiliary schooner yacht. 130 ft. overall. 110 ft. waterline, 26 ft. beam, 13.6 ft. draft. Speed under power 9 knots; compound engine; electric lights; all conveniences. Extremely able craft; heavily constructed. Cox & Stevens, 15 William St., New York.



No. 1796—For Sale or Charter—Very roomy, twin screw cruising power yacht, 99 x 17 x 4 ft. Speed 13 to 15 miles; Standard motors. Large dining saloon, six staterooms, three bathrooms, all conveniences. Cox & Stevens, 15 William St., N. Y.

No. 3529—For Sale—Fast bridge deck cruiser; 60 x 10.6 x 4 ft. Built 1916. Speed up to 18 miles; 8-cylinder 215 h.p. Van Blerck motor. Dining saloon containing pullman berth and transom forward; double stateroom aft. Cox & Stevens, 15 William Street, New York.



No. 3233—For Sale or Charter—Particularly desirable 123 ft. steel yacht. Speed up to 17 miles. Recent build. Dining saloon and social hall on deck; five staterooms, two bathrooms, etc. Cox & Stevens, 15 William Street, New York.

No. 3427—For Sale at Low Figure—Fast, roomy, twin screw cruising power yacht; 74 x 14 x 3.9 ft. New 1916; Lawley built. Speed up to 16 miles; two 6 cyl. "Speedway" motors. Large saloon, three staterooms, shower bath, etc. Cox & Stevens, 15 William Street, New York.

No. 1835—Estate Anxious to Sell—Handsome twin screw cruising power yacht; 98 x 16.6 x 4.6 ft. Speed 14-16 miles. Deck dining saloon, four staterooms, bath, two toilets, etc. Very desirable yacht available at low figure. Cox & Stevens, 15 William St., New York.

No. 1806—Bargain—Twin screw power yacht; 67 x 14.6 x 3 ft. draft. Speed up to 13⅓ miles; two 40 h.p. Sterling motors. Large saloon with two extension berths, 2 staterooms, bath and toilet, etc. Roomy bridge deck and large cockpit. Cox & Stevens, 15 William Street, New York.

No. 1997—For Sale—Cruising power yacht; 81 x 12 x 4 ft. Speed up to 15 miles; 6 cyl. 100-120 H.P. "20th Century" motor. Dining room, three staterooms, toilet room, etc. Reasonable price. Cox & Stevens, 15 William Street, New York.

No. 2758—For Sale—Most desirable up-to-date, 65 ft. cruiser available. Speed 11-12 miles. Remarkable accommodation, including deck saloon forward, dining cabin, double and single stateroom and bathroom aft. In splendid condition. (Has not been in Government service.) Cox & Stevens, 15 William Street, New York.

No. 2478—Bargain—Roomy twin screw power yacht; 77 x 16.6 x 3.6 ft. draft. Speed 11 miles; two 45 H.P. "20th Century" motors. Two saloons three staterooms, bath and two toilets. Cox & Stevens, 15 William Street, New York.

No. 316—For Sale at Low Figure—Twin screw cruising power yacht; 96.6 x 14 x 4.3 ft. Speed up to 15 miles; two 6 cyl. 60/90 H.P. motors new 1916. Dining saloon in deckhouse forward, three double staterooms, bathroom and two toilets. Cox and Stevens, 15 William St., New York.

Advertising Index will be found on page 140

NAVAL ARCHITECTS
ENGINEERS
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MARINE INSURANCE

GIELOW & ORR

52 BROADWAY, NEW YORK

Telephone: 4673 Broad
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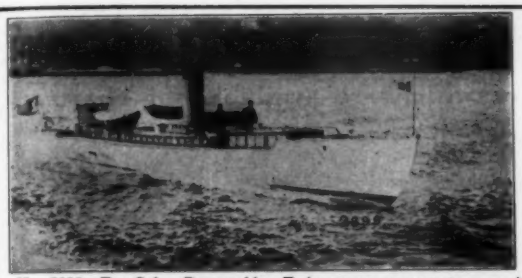
A.B.C. Code

ALSO: CHICAGO STEAMBOAT EXCHANGE, 350 NORTH CLARK STREET, CHICAGO

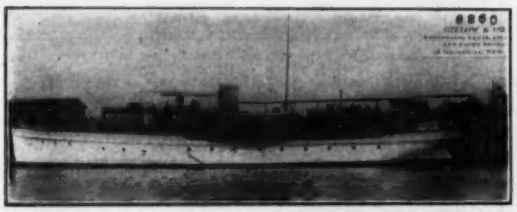
We have a most complete and up-to-date list of power yachts of all sizes, sail, auxiliary and houseboats on file in our office, kept constantly up-to-date by a thorough and comprehensive canvass of the entire yachting field from time to time. We are in a position to submit full information on any type of boat upon request. FOR SOUTHERN CRUISING this winter we offer a number of very desirable POWER HOUSE BOATS and POWER YACHTS which are specially adapted for FLORIDA waters.



No. 2399—For Sale—Reasonable—Twin screw express steam yacht, 112 feet length, double stateroom and saloon. Built by Herreshoff. Owned as gentleman's yacht. Never been in patrol service, in perfect condition. Suitable for ferry or racing yacht tender. Gielow & Orr, 52 Broadway New York City.

No. 232—For Sale—Handsome steel single screw steam yacht, 145 feet. 2 staterooms and deck dining saloon, also social hall on deck. Triple expansion engine and maximum speed 14 knots. Located New York. Gielow & Orr, 52 Broadway, New York City.

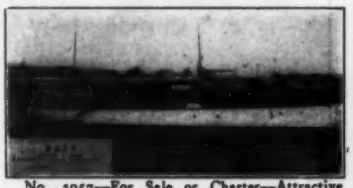
No. 4591—For Sale—Handsome twin screw steel sea going motor yacht, 126 feet length, 18½ feet beam, 6 feet draft. Built by Seabury. 5 staterooms, all modern equipment, perfect condition and located Great Lakes. Gielow & Orr, 52 Broadway, New York City.



No. 6260—For Sale—Desirable 85 foot twin screw motor yacht. Two double, one single stateroom. Owner's bathroom. Exceptional deck space. Inspectable Great Lakes. Gielow & Orr, 52 Broadway, New York City.

No. 3241—For Sale—Handsome auxiliary keel schooner, 114 feet on deck, 10 feet draft, built by Lawley, steel construction, 3 staterooms and powered with 6 cylinder Standard motor and giving speed 8 knots. One of best available yachts of type in perfect condition. Gielow & Orr, 52 Broadway, New York City.

No. 5951—For Sale—40 ft. Hand express cruiser. New 1917. Van Blerck motor. Speed 20 miles. Best construction. Able sea boat. Fully equipped. Price reasonable. Gielow & Orr, 52 Broadway, New York City.



No. 3957—For Sale or Charter—Attractive 75 ft. cruiser, beam 13 ft., draft 3 ft. 6 in. Standard engine, speed 10 knots. One double two single staterooms. Accommodate five persons. Electric lights, hot water heat. Bargain. Gielow & Orr, 52 Broadway, New York City.

No. 4606—For Sale—Very able 64 foot cruiser, 12 ft. 6 in. beam, 4 ft. draft. 6 cyl., Heavy Duty motor new last year. Speed 10 knots. One double one single stateroom opposite main saloon. Accommodate five persons. Boat heavily built, especially for offshore cruising. Price reasonable. Gielow & Orr, 52 Broadway, New York City.

No. 4199—For Sale—Desirable twin screw flush deck cruiser, 89 feet, beam 15 feet. Speed 12 miles. 3 staterooms and main saloon. Hot water heated and electric lighted, fully equipped and inspectable New York. Gielow & Orr, 52 Broadway, New York City.

No. 5850—For Sale—Modern 50 foot Express Hand cruiser, speed 20 miles, built 1916. 8 cylinder Van Blerck motor. Sleeping accommodations 4 persons. Completely equipped, inspectable near New York. Gielow & Orr, 52 Broadway, New York City.

No. 5455—For Sale—Desirable 48 foot cruiser having 14 feet beam, 34 inches draft, built 1915. Accommodations gives stateroom and saloon fully equipped. Speed 10 miles. Inspectable near New York. Gielow & Orr, 52 Broadway, New York City.

No. 6264—For Sale—Handsome keel and centerboard auxiliary schooner, 52' x 15' x 5' 6". Lawley built—excellent condition, fully found. Inspectable near New York. Gielow & Orr, 52 Broadway, New York City.

No. 4441—For Sale—Able offshore cruiser, 45 ft. length, 11 ft. beam, 3 ft. 6 in. draft. Extra heavy construction. Electric lighted. Heavy Duty Sterling motor. Speed 10 miles. Accommodates four persons. All perfect condition, fully equipped. Inspectable New York. Price low if sold before laying up. Gielow & Orr, 52 Broadway, New York City

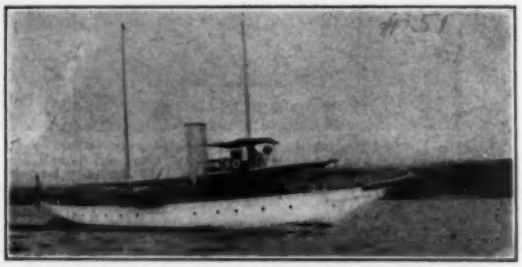
TAMS, LEMOINE & CRANE

NAVAL ARCHITECTS AND YACHT BROKERS

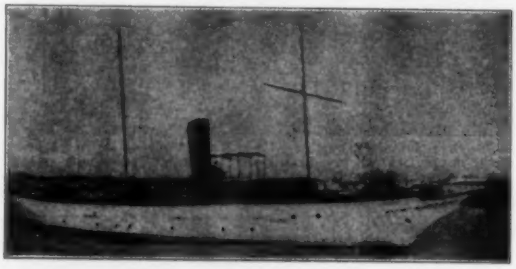
Telephone 4510 John

52 Pine Street New York City

Offer for sale the following yachts, some of which are available for charter

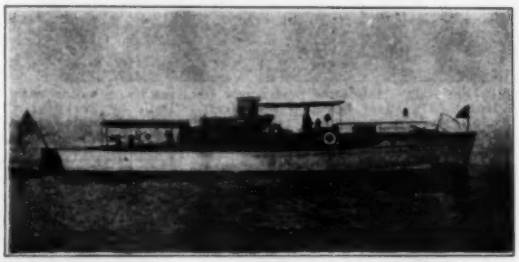


No. 51—For Sale—Price Attractive—Steam yacht. 115 ft. x 95 ft. x 15 ft. 6 in. x 5 ft. 5 in. draft. Built 1903. Triple Expansion Engines, Seabury Boiler, new 1913. 4 staterooms and two saloons.

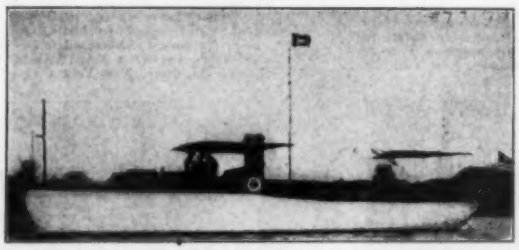


No. 7987—Sale—Charter—106 ft. cruising motor yacht; speed 13 knots; 4 staterooms, bathroom, main saloon, deck dining saloon, etc. Full equipment.

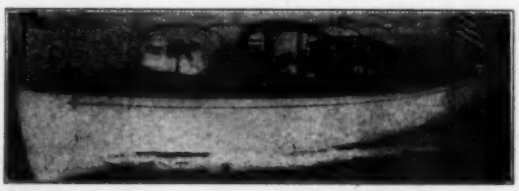
No. 18—For Sale—Estate anxious to sell fast cruising steam yacht, 147 ft. x 17 ft. x 7 ft. 3 staterooms, bathroom, dining saloon, sitting room.



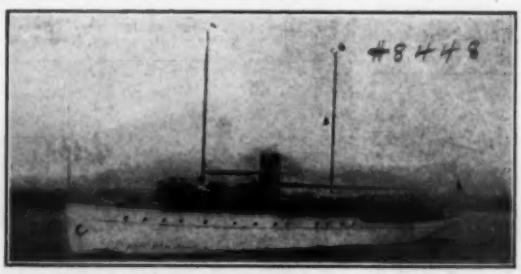
No. 8662—Sale—Twin Screw Cruiser. Speedway motors, new 1916. Speed 15 miles. Stateroom, saloon, large cockpit and bridge deck.



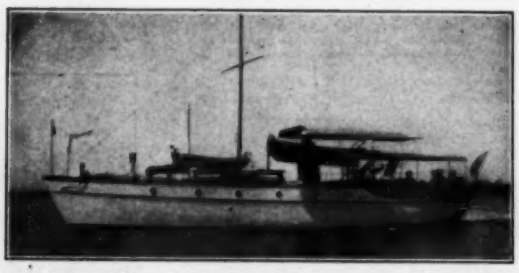
No. 7717—Sale—Raised Deck Cruiser, 60 ft. x 11 ft. x 3 ft. 6 in. 50 H.P. Speedway motor. Saloon, stateroom, galley, etc.



No. 8713—For Sale—Attractive Day Cruiser, 50 ft. x 8 ft. 3 in. x 3 ft. 1 in. draft. 6 cylinder Holmes motor. Speed 13 miles.



No. 8448—Sale—Charter—Attractive Raised Deck Cruiser, 123' x 18' 6" x 5' 9" draft; 6 staterooms, 2 bathrooms and 3 saloons.



No. 7579—Sale—Raised Deck Cruiser, 55' x 11' 6" x 3' 6"; 4-cylinder Standard motor. Speed 10½ miles. Two staterooms and saloon.

Advertising Index will be found on page 140

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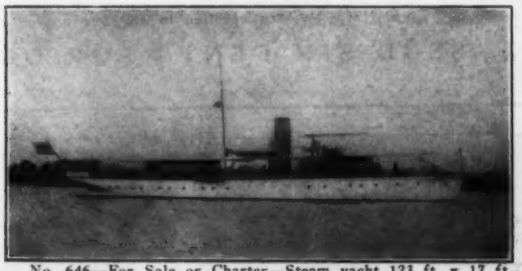
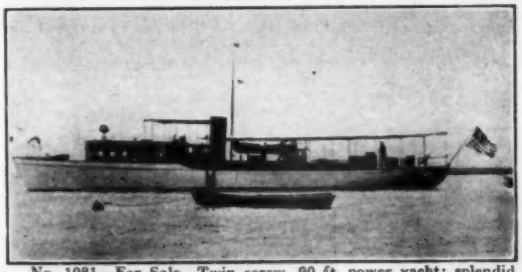
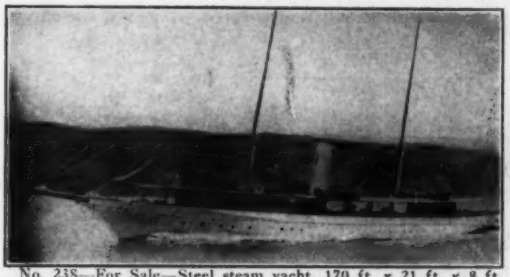
No. 1963—For Sale—Twin screw power yacht, 100 x 16.5 x 4.6, two 20th Century engines, 60/75 H.P. each. Deck dining saloon, 4 staterooms, main saloon, etc.



No. 646—For Sale or Charter—Steam yacht 123 ft. x 17 ft. x 6 ft. draft. 5 staterooms, 3 bathrooms. Dining saloon and social hall on deck.

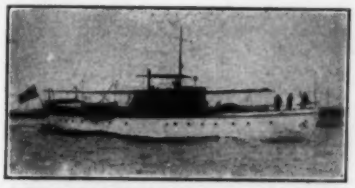


No. 1081—For Sale—Twin screw, 90 ft. power yacht; splendid accommodation. Recently overhauled and 2 new Standard engines, 4 cylinder, 75 H.P. each, installed 1916. Exceptionally able and fully found.



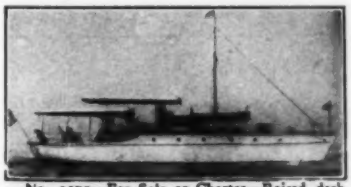
No. 238—For Sale—Steel steam yacht, 170 ft. x 21 ft. x 8 ft. draft. Large dining saloon, social hall and smoking room on deck; 5 staterooms, 3 bathrooms, etc. Completely equipped.

No. 2079—For Sale—45-Foot ELCO bridge deck cruiser. Standard engine. Excellent condition. Completely furnished and fitted.

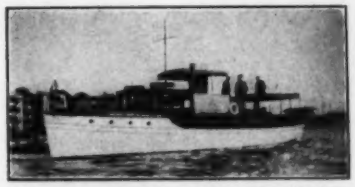


No. 1736—For Sale—Twin screw power yacht, 97 ft. x 16 ft. 7 in. x 3 ft. 6 in. 4 staterooms, bath room, deck dining saloon, etc.

No. 2379—For Sale—Bridge deck cruiser, 53 ft. x 13 ft. x 3 ft. 6 in. Double stateroom, main saloon, etc. Price reasonable.



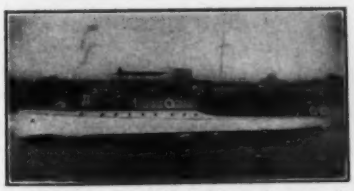
No. 1270—For Sale or Charter—Raised deck cruiser 55 x 12 x 4.6. Standard engine 32/37 H.P. Has two staterooms, main saloon, galley, etc. William Gardner & Co., 1 Broadway, New York.



No. 1914—For Sale—Raised deck and cabin house cruiser. 50 x 10 x 4. 50 H.P. motor. Price low.

No. 2386—New Patrol type, 54 x 11.3, eight cylinder Van Blerck, speed 17 miles.

No. 1703—For Sale—Bridge deck cruiser, now in commission in Southern waters; 65 ft. x 14 ft. x 4 ft. 6 in.; 100 h.p. 6-cylinder engine; speed 10 knots. Has large saloon with extension berths, 2 double staterooms, galley, etc. Completely found.



No. 1738—Raised Deck Cruiser, 65 x 11, six cylinder motor, good accommodation.

No. 2351—For Sale—58-Foot Twin Screw Express Cruiser. Has 2 staterooms, galley, etc. Two 200 h.p., each 8-cylinder Van Blerck engines; speed 25 to 27 miles.

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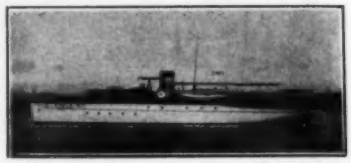
3826—Auxiliary keel schooner 64 foot overall. Two staterooms. Two berths and two transoms in saloon. Sterling motor. Owned by an Estate.

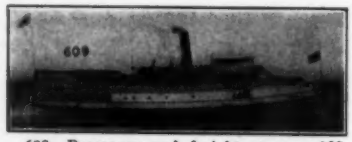
2014—71 foot twin screw express cruiser. Three staterooms. Two berths in saloon. Two toilets. Speed 24 knots.



1281—98 foot twin screw. Four staterooms. Dining saloon, two toilets and bath, etc. Speed 15 miles.

4021—120 foot twin screw express steam yacht. Double stateroom, main saloon, dining saloon, etc. Speed up to 27 miles.

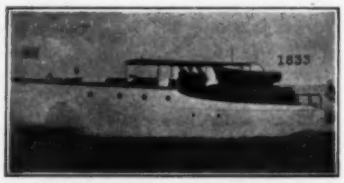
1714—58 foot twin screw express cruiser. Two staterooms, etc. Speed 25-30 miles.



609—Passenger and freight steamer 130 feet long; 15 staterooms; cargo capacity about 300 tons. Speed 12 miles.

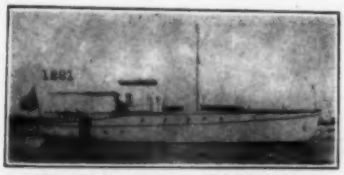
848—75 foot cruiser. Two double staterooms, main saloon, bath, etc. Standard motor. Speed 12 miles.

1596—60 foot twin screw cruiser. Double stateroom, two berths in cabin. Two toilets, etc. Speed 12 miles.



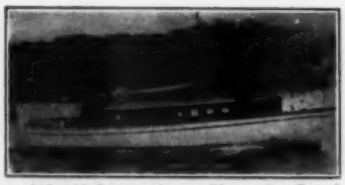
1833—45 foot express cruiser. Double stateroom, two berths in main cabin, two toilets, etc. Speed up to 23 miles.

1949—40 foot cruiser. Sleeps 5 people. Speed 10 miles.



1221—55 foot cruiser. Double stateroom, two berths in cabin, toilet, etc. Speed 10 miles.

1812—45 foot Elco cruiser. Double stateroom, saloon and engine room. Sleeps 8 people. Two toilets. Speed 10 miles.



1525—43 foot cruiser. Sleeps 5. Speed 9 miles. Price attractive.

2027—50 foot cruiser. Two berths in pilothouse, two double berths in main cabin, two berths in engine room, two toilets, etc. Speed 10 miles.

1638—40 foot cruiser. Double stateroom, two berths in cabin. Speed 10 miles. Splendid proposition. Price attractive.

Advertising Index will be found on page 140

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No. 135—Ocean Going Steam Yacht; length 215 ft.; 880 Tons; comparatively recent build; 2 decks; latest type.
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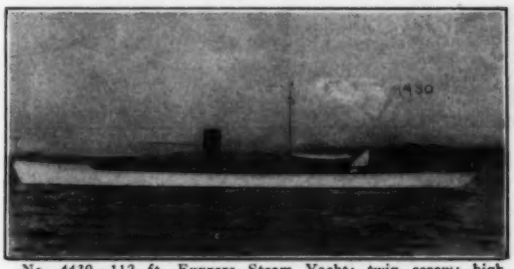
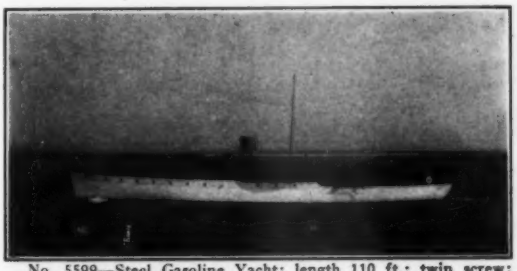
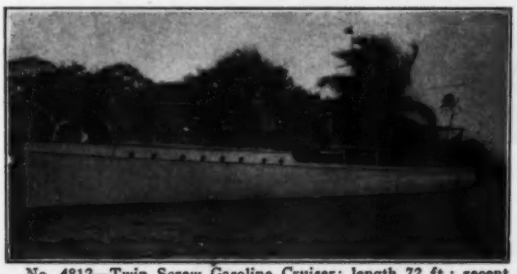


No. 4430—112 ft. Express Steam Yacht; twin screw; high speed; Herreshoff build; A1 condition.
FRANK BOWNE JONES, Agent, 29 Broadway, New York.



No. 5599—Steel Gasoline Yacht; length 110 ft.; twin screw; of the best design and build.
FRANK BOWNE JONES, Agent, 29 Broadway, New York.



No. 4812—Twin Screw Gasoline Cruiser; length 72 ft.; recent build; excellent accommodations.
FRANK BOWNE JONES, Agent, 29 Broadway, New York.

No. 488—Express Cruiser; built by Seabury Company; practically new; length 68 ft.; 2 Speedway engines; speed up to 20 miles per hour.
FRANK BOWNE JONES, Agent, 29 Broadway, New York.

No. 2807—Power Houseboat; length 73 ft.; twin screw; comfortable seaworthy cruiser.
FRANK BOWNE JONES, Agent, 29 Broadway, New York.

No. 648—Auxiliary Schooner Yacht; dimensions 83 x 63 x 18 x 7½; built 1915; well and strongly built; good as new.
FRANK BOWNE JONES, Agent, 29 Broadway, New York.

No. 5523—Gasoline Cruiser; length 60 ft.; 2 staterooms, saloon and bath; 6 cylinder motor.
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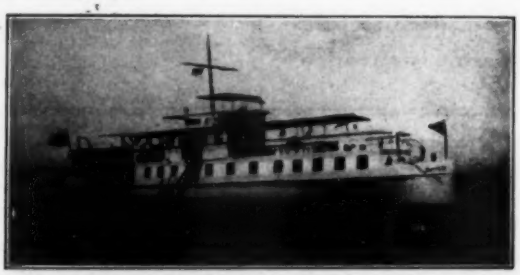
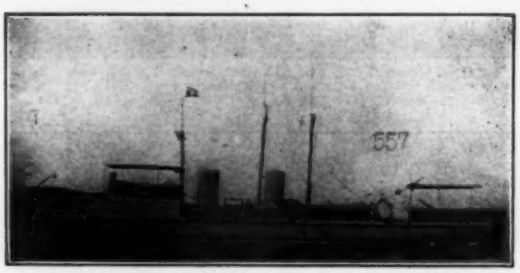
No. 81—For Sale—145 ft. steel steam yacht; perfect condition. All modern conveniences.



No. 619—For Sale—Commodious 110 ft. houseboat. Ideal northern and southern floating home.

No. 883—For Sale—71 ft. twin screw express cruiser; 3 staterooms. Speed 24 knots. Excellent lines and very seaworthy.



No. 557—For Sale—68 ft. cruiser; 3 staterooms. Shower, etc. Exceptionally fine looking yacht and very seaworthy. Speed 12-14 miles.

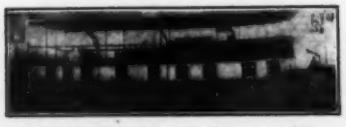
No. 811—For Sale—48 ft. cruiser, sleeping 6 persons.

No. 777—For Sale—60 ft. cruiser sleeps 5 persons. Speed 18 miles.

No. 353—For Sale—55 ft. cruiser sleeps 5 persons. Speed 15 miles.

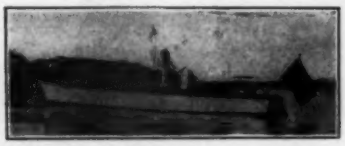
No. 297—For Sale—45 ft. Elco cruiser; sleeps 8 persons.

No. 337—For Sale—43 ft. cruiser sleeps 6 persons.



No. 614—For Sale—50 ft. power houseboat; 3 staterooms.

No. 91—For Sale—91 ft. passenger steamer, licensed to carry 300 people.



No. 355—For Sale—21 ft. runabout; speed 12-14 miles.

No. 89—For Sale—130 ft. freight steamer. Cargo capacity 400 tons d.w.

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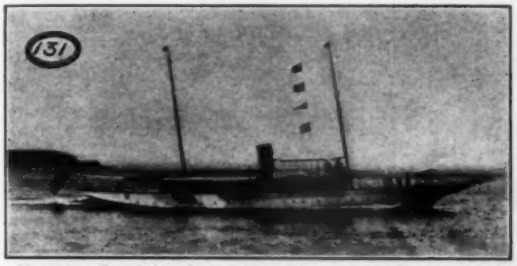
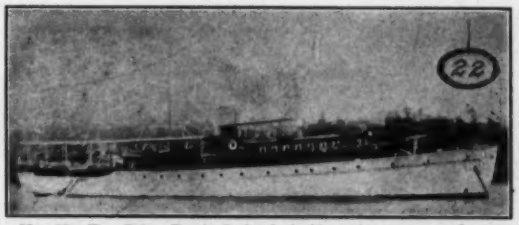
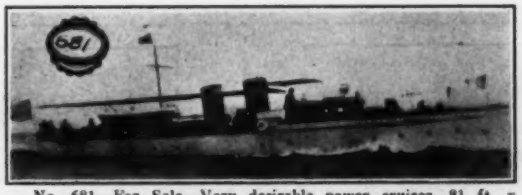


No. 131—For Sale—Attractive single screw steel steam yacht. 147 ft. x 17 ft. x 7 ft. 3 in. draft. All modern conveniences. Two staterooms. Large deck dining saloon and social hall.

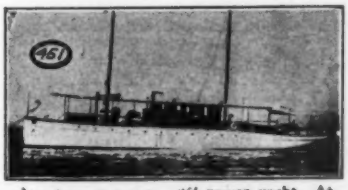


No. 22—For Sale—Particularly desirable twin screw steel power yacht. Thoroughly modern. 126 ft. x 18 ft. 6 in. x 6 ft. draft. Built by Seabury. Owner's quarters consist of five staterooms, two bathrooms, dining saloon on deck. Excellent condition.

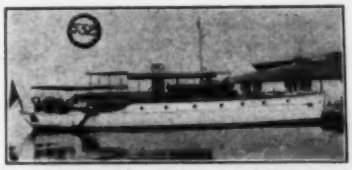
No. 30—For Sale—Low Price—Fast twin screw power yacht. 105 ft. x 15 ft. 5 in. x 4 ft. 9 in. draft. 3 staterooms, two bathrooms. Speed up to nineteen miles. Standard motors.



No. 681—For Sale—Very desirable power cruiser, 81 ft. x 12 ft. x 4 ft. draft. 3 staterooms, dining saloon, etc. Six cylinder heavy duty motor. Exceptional offer.



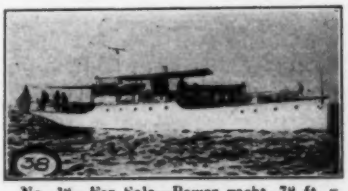
No. 4[illegible] For Sale—85' power yacht. Attractively furnished throughout. Equipped for extensive cruising. Two double and one single staterooms. Located Great Lakes.



No. 532—For Sale—71 ft. twin screw, flush deck motor yacht. Built by Seabury. Able seaboat. Excellent condition throughout.

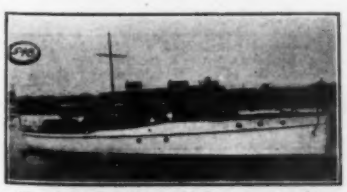
No. 705—For Sale—Attractive price. Twin screw power yacht 71 ft. x 13 ft. 6 in. x 3 ft. 9 in. draft. Will accommodate owner's party five to seven. Speedway motors.

No. 861—For Sale—Very fast and consistent express cruiser. 60 ft. x 10 ft. x 3 ft. draft. Two Sterling motors.

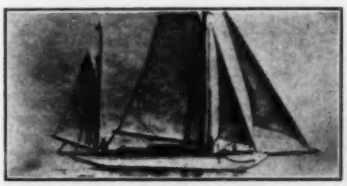


No. 38—For Sale—Power yacht, 78 ft. x 14 ft. 6 in. x 5 in. draft. Exceptionally able seaboat. Three staterooms aft. Built by Lawley.

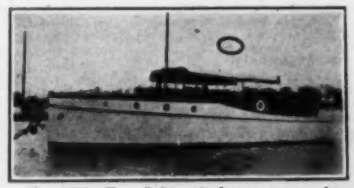
No. 683—For Sale—Exceptional 45 ft. cruiser. Speed up to 18 miles. Accommodations 4-6. Excellent condition. Low price.



No. 548—For Sale—65 ft. power cruiser. Dining saloon, 2 staterooms, etc. A very comfortable yacht for extensive cruising. Low price.



No. 555—For Sale—Auxiliary yawl. 55 ft. x 36 ft. x 15 ft. x 5 ft. 6 in. draft. Three staterooms, dining saloon. Full equipment.



No. 106—For Sale—40 ft. power yacht. One double stateroom, dining saloon, galley, two toilets. Speedway self-starting motor. Low price.

THE MOTOR BOATING MARKET PLACE

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Cut one inch deep, one column wide..... $2
Cut 1½ inches deep, 1½ columns wide..... $5
Cut 2¼ inches deep, three columns wide.....$15

Opportunities for the Motor Boatman

Before you buy or before you sell examine the exceptional buying and selling opportunities under this heading. They comprise the best offer of the month Please mention MoToR BoatinG.

No. 421—FOR SALE—Offered by estate. Twin screw, flush deck, steel, gasoline yacht. Finest of her type available. 138 ft. x 16 ft. x 4 ft. 6 in. Three single and three double staterooms. Two baths. Two deckhouses containing large dining saloon and social hall. Every modern convenience. Equipment unusually complete. Speed up to 20 miles per hour. Large cruising radius. Edward P. Farley Co., Railway Exchange Bldg., Chicago, Ill.

FOR SALE—Or will exchange for medium weight touring car 30 ft. x 6 ft. fast, staunch and seaworthy completely equipped, rear starter, reverse gear, full automobile control searchlight, Atwater Kent ignition 30 H.P. 4-cylinder 4-cycle motor, force feed oiler, Pyrene and tender and storage battery. Also have 1 Ford engine complete with steering gear, gas tank, muffler clutch, reverse, universal joint and force feed oiler all for $50.00. R. Tuthill, 6 Buttonwood Rd., Essex Fells, New Jersey.

FOR SALE—This new work boat, never been used. 36 x 9, has 4 cycle 18 H.P. Lamb engine, one man controls. Flush deck with hatch in the center of deck, fully equipped and in the water ready to go to work. Price $1,200. Ed. Keil, Glenworth Ave., North Beach, L. I.

WANTED IMMEDIATELY, second-hand four cylinder, four cycle motor, good order; 24 to 30 H.P.; about 500 R.P.M.; T head cylinders; weight 1,500 to 1,800 pounds. 24 H.P. Anderson preferred. J. R. B., 815 Fulton Street, New Orleans.

FOR SALE—4-cyl. heavy duty Sterling Engine, 25-35 H.P., in the very best of condition. Has never been run over 500 miles. Apply G. O. Doloph, 121 Beverly St., Boston, Mass.

FOR SALE—A staunch little Auxiliary Cruising Yawl. Keel design, flush deck, full head room, main cabin and forward compartment, ice box, lockers, drawers, toilet, and all outfit for cruising. A quantity of sails in good condition, also gear, ropes, lights, cushions, curtains. A Mianus Engine H. D., 10-12 H.P. drives about 5½ knots. All spars and standing rigging first class. Dimensions, 42 feet over all; beam, 11 feet, draft, 6 feet. A bargain for $700. Cost $5,000 to build. Can be seen at Sheepshead Bay, Brooklyn, N. Y. E. Hayes, 665 65th St., Brooklyn, N. Y.

WANTED—Modern auxiliary yacht, 38' to 45' O. A. Tonnage less than 5 net tons. Cruising accommodations for from 4 to 7. Wish to charter for one or more seasons. Theo. E. Street, Rocky River, Ohio.

FOR SALE—35-foot mahogany, Elco Express, without motor, $1,000; or with 6-cylinder American & British Mfg. 60 H.P. motor, $1,600; or 6-cylinder 45-65 H.P. Sterling, $2,000. This outfit is in good condition and has an unusually complete equipment, including electric lights, auto top, leather cushions, four wicker chairs, life preservers, windshield, searchlight, canvas cover, fenders, flags, etc. With either of the above motors the boat should make 25 miles per hour and is a bargain. R. E. Henry, 27 Pine Street, New York City.

FOR SALE—75 ft. cruiser. Aft, two staterooms and toilet. Forward, dining saloon, galley, forecastle. Inquire of Morgan Barney, 29 Broadway, New York.

FOR SALE—25-foot Pleasure Launch with 25 horse power Sterling engine. For particulars apply to Mrs. Bertram C. Bixby, 144 Gibbs St., Newton Center, Mass.

FOR SALE—Open launch, 20 x 6, fitted with Palmer's P1 Engine, which is entirely under cover. Has reversed gear and is fully equipped. $250. Can be seen by appointment. W. R. Cartwright, 68 Cove Avenue, South Norwalk, Conn.

Buy it now. Marine and automobile engines, carburetors, coils, magnetos, generators, all repair parts for your boat or car. Write us for quotations and save money. Haviland Supply Co., 2306 Seventh Ave., New York City.

FOR SALE—1 cylinder 2 cycle 4 H.P. Detroit with coil, propeller, Schebler Carburetor, kerosene injector. Used two months. Price $45. D. S. Ward, Ann Arbor, Mich.

FOR SALE—One hundred 8-cylinder motors 3" bore by 4½" stroke. Brand new and block tested. $100.00 each. New equipment including Atwater-Kent distributor and coil, Stewart carbureter, Dyneto starter and generator $100.00 extra. Regal Motor Car Co., 216 Piquitte Ave., Detroit, Mich.

RARE BARGAIN. Patterns, gigs, blueprints, reamers, drills for building 6 x 7 4 cycle marine motors. Can be seen at D. J. Gray, 1298 Cramer St., Milwaukee, Wis.

CANADIANS, Second-hand engine bargains. Send for list.
GUARANTEE MOTOR COMPANY
73 Bay Street, North Hamilton, Ont., Canada

FOR SALE—26-ft. mahogany runabout. Fay & Bowen 35 H.P. engine. Electric lights. McClellan one-man top. Complete equipment. Speed 18-20 miles. Cost over $2,000; will sell for $1,000. Write for particulars W. O. Bixler, Easton, Pa.

A few medium and high speed, one, two, four and six cylinder, four-cycle marine motors, new or rebuilt. Reliance Motor Boat Co., 210th Street and Harlem River, New York City.

FOR SALE—Doman heavy duty marine twin cylinder motor, six to eight horse, 4 x 5, 4 cycle, reverse gear, Conn. coil, force feed oiling, weight 550, perfect condition, used less than 90 days actual service. List $400. First check $160 takes motor. H. H. Clark, 519 High St. Oshkosh, Wis.

FOR SALE—35-foot Hand V Bottom Cruiser with 50-70 H. P. Brennan motor; practically new. Would consider trading for a smaller boat. C. A. Donovan, 160 Berkeley Street, Lawrence, Mass.

WANTED—Cabin Boat, 25 ft., with motor. Must be in good condition. $200-$300. Sale, 922 Morris Ave., New York.

FOR SALE—Automatic 25 H.P. heavy duty marine engine, 2 cylinder, 4 cycle, with carburetor, magneto, reverse gear, water and air pumps. Like new; overhauled at factory; still in crate. $600. E. W. Smith, 618 So. Center, Terre Haute, Ind.

WANTED—Bridge deck cruiser about 45 feet long, to accommodate about 6 persons. Fully equipped. Address with full particulars: Box 1, MoToR BoatinG.

FOR SALE—Good Runabout, 24 ft. long by 5 ft. beam. New 1914. 2 cyl. T. & M. motor, 8 H.P. Speed 10 miles. Bronze fittings throughout. Full equipment, lights, anchor, lines, flags and life belts. Price $190. Gordon Baxter, Palmyra, N. J.

WANTED—Hyde 3-bladed right hand wheel 24 x 26. Will buy or will trade 24 x 30 wheel. W. R. Goodwin, 542 S. Dearborn St., Chicago.

WANTED—Auxiliary Yawl or Cabin Cruiser, 36 to 40 foot, on Great Lakes preferred. Give full description and price. Box 20, MoToR BoatinG.

WANTED—A representative on a commission basis, now calling on sporting goods trade to handle a line of canoe and motorboat life preserver cushions; also Ilanasilk Camp Mattresses and Pillows. Ilanasilk Equipment is especially designed for use on the water and in the camp. Address The Robinson-Roders Co., 445 Broadway, New York City.

Advertising Index will be found on page 140

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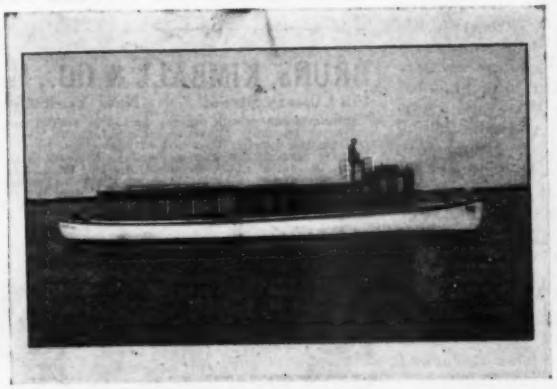
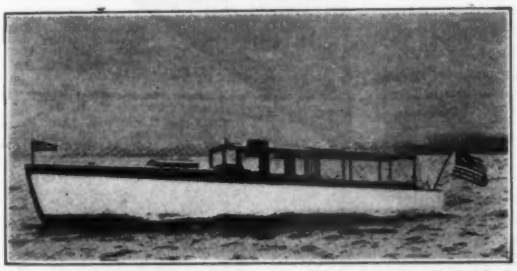
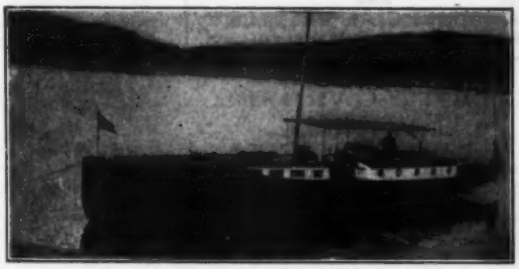


Ferry boat 60 ft. x 12 ft. x 3 ft. 6 in. Six-cylinder Buffalo engine 6 in. x 7½ in. Speed, 10 miles per hour. Seating capacity, 50. In excellent condition. Write for particulars to Earl Holley, 145 Willis Avenue East, Detroit, Michigan.

Cruiser 42 ft. overall 9 ft. 4 in. beam, two cabins sleeping four forward and two aft; self-bailing cockpit, four-cylinder, four-cycle heavy duty motor 5½ x 7½, giving cruising speed of 12 miles; engine room located amidships forward of companionway. It is equipped with galley, fresh water tanks, dish cupboard, two-burner stove, sink, toilet, chain locker, as well as anchors, sailing lights, life preservers, flags and all necessary equipment. Located Holland, Michigan. First offer over $750 cash takes it. R. E. Becker, Grand Rapids, Mich.



FOR SALE—Raised deck cruiser, Dixie Model, all finished in mahogany. Practically new. Niagara Engine, 65 h.p. Speed 20 miles. 38 ft. by 6 ft. 6 in. Rope well, tank, toilet room. Front cabin 9 ft. 6 in. Will sleep four. Engine room connected with kitchen. Stove, table, cabinet, lavatory. Bow cockpit with folding mahogany tables and chairs. Address Hannan & Henry Motor Car Company, Ogdensburg, New York.



FOR SALE or CHARTER—60 ft. cruiser, two double staterooms, dining room, galley, forecastle. Inquire of Morgan Barney, 29 Broadway, New York.

FOR SALE—2 360 H.P. Duesenberg Marine engines, new, 8 cylinders 6¼" x 7¼"—each $5,000. Also a 72-foot new motor boat, equipped with three of these engines, speed 35 miles an hour. Cost $52,000—Our price $35,000. Box 25, MOTOR BOATING.

FOR QUICK DELIVERY, at low prices, high grade, heavy duty, marine crude oil engines of 40, 60, 75, 85, 112 and 150 B. H. P. Recent changes in owner's plans makes these engines available. Jacobson Engineering Co., 5 Second Ave., Rensselaer, N. Y.

Cruiser 44 ft.-9 ft. 3 in.-28 in.-30 H.P. Palaco engine 4-cylinder 4-cycle, has not run 500 miles. Full inventory. Beautiful boat, best design and finish. Would cost $14,000 to replace; will sell for $2,500. Owner has quit the game. Best bargain on the coast. Write for photo and description. No postals. S. M. Holman, 39 Pleasant St., Attleboro, Mass.

WANTED—House boat or cruiser fit to cruise from New York to Florida for two couple and one sea skiff. Give description and price. Address, J. J. Rampe, New York City, General Delivery.

WANTED—Tuttle cylinder in good condition. 4½ inch bore, model "N" or engine cheap. A. C. Burrell, 106 High St., East Weymouth, Mass.

AFTER WAR SALE

New WISCONSIN VALVELESS MOTORS 4 to 25 H.P., 1, 2 and 3 cylinder at less than cost. Ask for Catalog.

WISCONSIN MACHINERY & MFG. CO., Milwaukee, Wis.

A 30 H.P. Mertz & Weiss, 2 cylinder Kerosene Marine Oil Engine, complete with clutch, shaft and propeller, thoroughly overhauled. Bargain. Room 1814, Astor Trust Bldg., New York City.

Motor boat hulls, from 12 to 50 ft., all styles, with and without power, at reasonable prices. Good used engines, all types, cheap. We can offer you a good bargain in a complete motor boat or motor only. Tell us what you would like to have and we will quote our lowest price. Atlantic Supply Co., Long Branch, N. J.

WILL TRADE for a large first class pleasure boat my late patented and incorporated amusement device, the HOBBY-HORSE-ALUOMOBILE, a big money maker. For full particulars write Dr. F. C. Loder, Evansville, Ind.

FOR SALE—6 cylinder, 114 to 190 H.P. Loew-Victor-Harbeck; 4 cylinder 40-60 H.P. and 4 cylinder 25-30 H.P. Continental; 30 H.P. Termaat & Monahan; 24 H.P. model "T" Gray, $235.00; 16-20 H.P. 4 cylinder 4 cycle Thomas, $165.00; 4 cylinder 4 cycle Buick, $120.00; 12 H.P. 2 cylinder Kalenberg, $530.00; 10-12 H.P. 2 cylinder 4 cycle Monarch, $325.00; 6 H.P. Monarch, $45.00; 10 H.P. 2 cylinder 4 cycle Burgess, $120.00; 2 cylinder 2 cycle Ferman, $75.00; 1 cylinder 6 H.P. Gray, $60.00; 4 H.P. 2 cycle DuPree, $40.00; and 90 others, marine, auto and stationary engines, also propellers and other accessories of every kind. Get our complete list. Jesiek Boat Co., Grand Rapids, Mich.

FOR SALE—Mason motor, 125 H.P. 5½x6" six cylinder enclosed type. Motor is complete with magneto, carburetor, plugs, electric starter and reverse gear. Has been run very little. Address Box 10, MOTOR BOATING.

FOR SALE—New 3 H.P. Koban, two cylinder outboard motor with built-in magneto. Never been used. One large brass binnacle. 447 Terrace, Ave., Grand Rapids, Mich.

BOSCH Magnetos: All types $10.00 each and up—Coils—Remy, Splitdorf, etc., $3.00 and $5.00—Low Tension Magnetos $3.50—Presto Tanks $5.00—Leather Cushions $1.00—Spot Lights $3.40—Lighting Generators $0.00—Carburetors all types $5.00 and $8.00—Auto Motors, both water and air cooled, all sizes $30.00 each and up. Write for bulletin. Johnston, West End, Pittsburgh, Pa.

Three Kermath Marine Engines 12-16-&-20 H.P. All new. All 4-Cylinder 4-Cycle. A Bargain to the buyers. W. W. Warren, Box 774, Hartford, Conn.

USE "SNAPPER" ENGINES for your small boat. They are a big little engine built by The Automatic Machine Co., Bridgeport, Conn.

WANTED—From 35 to 45 ft. comfortable cruiser, full equipment. State lowest price. No dealers. Quick action; cash ready. Leon Brown, 3800 Broadway, New York City.

Marine and automobile engines 1 to 100 H.P. Best makes—good condition—very low prices. State your power needs. We take engines in trade. What have you? Magnetos, coils, carburetors, mechanical oilers, water pumps, etc. Also car parts of every nature—sacrifice prices. Write about your requirements. Badger Motor Company, Milwaukee, Wis.

Trimount Whistle Blower Outfits

Blower runs by friction contact with engine flywheel. Whistle of brass, nickel-plated.

Made in 3 sizes.

Trimount Rotary Hand Bilge Pumps

All bronze composition. Suction lift 6 to 20 feet. A lifelong convenience.

Made in 3 sizes.

TRIMOUNT ROTARY POWER CO.

20 Heath Street Boston, Mass.

(Factory: 292 Whiting Ave., East Dedham, Mass.)

NAVAL ARCHITECTS & YACHT BROKERS

Thomas D. Bowes, M. E.
NAVAL ARCHITECT AND ENGINEER
Offices:
Lafayette Bldg., Chestnut and Fifth Sts.
PHILADELPHIA, PA.

COX & STEVENS
Engineers and Naval Architects
Yacht Brokers
18 WILLIAM STREET, NEW YORK CITY
TELEPHONE 1378 BROAD

THE EDWARDS ENGINEERING CO.
NAVAL ARCHITECTS & ENGINEERS
DESIGNERS OF
OIL ENGINED YACHTS
AND
COMMERCIAL VESSELS
18 SO. 7TH ST. PHILADELPHIA, PA.

ELLIOTT GARDNER
NAVAL ARCHITECT
104 South Street, Stamford, Conn.
UP TO DATE DESIGNS
Complete plans, Instructions and Patterns. Latest and most efficient designs in Fast V Bottom Runabouts and Cruisers. Seagoing Cruisers and Auxiliaries. Hydroplanes, Yacht Tenders and Row Boats. State type of boat wanted and write for Blue Prints.
Latest thing out for Amateur Builders. A 20 foot V Bottom runabout especially designed to give best results with a Ford Auto Engine. Speed, 18 to 20 M.P.H.

William H. Hand, Jr.
NAVAL ARCHITECT
NEW BEDFORD, MASS.
HAND-V-BOTTOM DESIGNS
Write for 48-page illustrated catalog

FREDERICK K. LORD
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120 BROADWAY NEW YORK

FREDERICK S. NOCK
Naval Architect and Yacht Builder
Marine Railways, Storage, Repairs
East Greenwich Rhode Island

HARRY W. SANFORD
YACHT BROKER
501 FIFTH AVE., at 42nd St., N. Y.
Desirable yachts of all types for sale and charter
Telephone 949 Vanderbilt

What to Blow and When to Blow It

(*Continued from page 26*)

Keeping in mind the two sides of the boat, that is, port and starboard, we have the former word *port* of *one* syllable, and the other side of the boat indicated by a word of *two* syllables, namely, *starboard*. If one simply remembers that the word of *one syllable* is always associated with one blast of the whistle and the word of *two syllables* with *two blasts* of the whistle, he will have no difficulty in giving and obeying the passing whistle signals. If the oncoming boat gives you *one* blast of her whistle it is your duty to answer with *one* blast of the whistle provided all is well. This signal of *one* blast is an indication that the boats must pass *port* side to *port* side. If *two* whistles are given and answered, associate this signal with the word of *two syllables*, and the boats will then pass *starboard* side to *starboard* side. This simple rule holds good in all instances of boats meeting and crossing.

Of course, it is unnecessary to call one's attention to the fact that one blast must always be answered by one blast and two blasts with a similar number. Any other way of replying is not permissible providing that circumstances do not exist which would make the carrying out of the action indicated by the signals dangerous. If the situation is considered dangerous by the skipper of either boat or even if the action which either one of the two boats intends to take is not fully understood by the other it is the duty of the person in doubt to give the danger signal on his whistle which consists of *four* or more short and rapid blasts. When the danger signal has been given it is the duty of each boat to stop at once and proceed only with caution after the proper signals have been given, answered, and understood.

While the Navigation Laws and passing rules do not recognize any particular type of boat or class of service over any other class, yet, in some instances the Special Circumstance Rule mentioned previously might tend to give preference in particular instances to this or that type of boat. For example, a tug boat with a tow of barges has no more rights while navigating the waters than a steamer or motor boat without a tow. In fact, the burden of the obligation falls upon the tug to navigate in such a way that she will not jeopardize the rights of other craft.

Examples as to how the passing rules work out in specific instances might be interesting and instructive. Some of these are graphically shown on pages 24 and 25. Taking up the various situations shown in the diagram in the order of the their numbers we have (1) a ferryboat coming out of a slip. In a case of this kind the ferryboat has no rights nor can she exercise any rights of way until she is entirely free and clear of the ferry slip. As she leaves the slip it is her duty to give one long blast on her whistle as a signal of her exit rather than as a passing signal. As

(*Continued on page 62*)

TAMS, LEMOINE & CRANE
Yacht and Ship Brokers
Naval Architects
Marine Engineers
52 Pine Street New York

BRUNS, KIMBALL & CO., Inc.
115 Liberty Street New York City
Offer over 200 re-built engines, backed by a strict guarantee, at especially attractive prices. List will be sent free for the asking. Your present engine will be taken in part payment for a new Sterling, Kermath, Gray-Prior, Doman, Missouri, Universal, 4 cycle; Eagle, Hartford and Arrow, 2 cycle; Missouri heavy oil engines, simple and economical. Burnoil, heavy duty 4 cycle heavy oil engines, quick starting, economical, easy to operate. Write for offer.

ANDERSON ENGINES
ASK ANY USER
Anderson Engine Co., 4032 N. Rockwell St., Chicago. New York Office, N. W. Cor. Broome & Lafayette Sts.

ELECTRICAL HEATING AND COOKING DEVICES FOR Motor Yachts AND Motor Yacht Builders
Flat Irons, Toasters, Grills, Toaster Stoves, Curling Irons, Heaters, Soldering Irons, Air Heaters, Glue Pots, Etc.
American Electrical Heater Co. Detroit, U. S. A.
Write for Illustrated List, Prices and Descriptions. Oldest and Largest Exclusive Makers. Estab'd 1884.

Nautical Instruments
underlighted Compasses, Course Protractors, Bearing Finders. Every navigator should have them. Send for interesting catalogue. Address Box 45.
Marine Compass Company. Bryantville, Mass.

LEECE-NEVILLE
ELECTRIC STARTING-LIGHTING SYSTEM
OUTFITS OF QUALITY
AUTOMOBILES
ALWAYS READY
MOTOR BOATS
DAY OR NIGHT
MANUFACTURED BY
THE LEECE-NEVILLE COMPANY
CLEVELAND, OHIO

Advertising Index will be found on page 140

REG. U. S. PAT. OFF.

John Curtin Corporation

ESTABLISHED 1853

46-48 FRONT STREET

NEW YORK, N. Y.

TEL. 6006 BROAD

Cable Address "NITRUCON"

Makers of

"CURTINMADE"

Sails	*Canvas Goods of Every Description*	Tents
Awnings		Tarpaulins
Boat Covers	Spray Hoods	Flags

Graphic Navigation

(*Continued from page 34*)

EIGHTH STEP

FIGS. 28 and 28a

Compare the calculated h with the observed h.

Observed h	46°	37′	55″.3
Calculated h	46°	33′	55″
Altitude Diff.		4′	0″.3

Subtract the less from the greater. In this case lay off the difference toward the Sun since the observed h is the greater.

NINTH STEP

Get the Azimuth.

The Azimuth is found in Hydrographic Pub. No. 71 for 1918.

Data for Azimuth, 4 parts necessary.

1. Date, September 10, 1918, p.m.
2. Lat., 28 degrees 15 minutes north.
3. Local Apparent Time, 2 hours 35 minutes 4 seconds.
4. Declination, 5 degrees 5 minutes 45 seconds.

In the table under 28° and in column of September 10th, in line with the time, $2^h\ 30^m$ p.m., take out the Azimuth, 115° 52′.

Also take out the Azimuth for $2^h\ 40^m$, which is 113° 43′. As our time is $2^h\ 35^m$ we interpolate thus,

115°	52′
113°	43′
2)228°	95′
114°	48′ Z for $2^h\ 35^m$ at 28° Lat.

Turning to table under 29° perform a similar operation, same date and times. Thus,

116°	51′
114°	39′
2)230°	90′
115°	45′ z for $2^h\ 35^m$ at 29° Lat.
Subtracting 114°	48′
4) 1°	roughly
15′	for 15′ of Lat.

Thus 114° 48′ plus 15′ equals 115°, about, for $2^h\ 35^m$ at 28° 15′ Lat. N.

TENTH STEP—Plot Position of Ship

Bearing of Sun at time of observations was about W. S. W.

From the assumed position and with an angle protractor lay off the line of Azimuth on a Mercator chart N. 115° W. and on it the Altitude Diff., getting the length of the nautical mile from the scale at the side of the Chart.

Draw a line intersecting the line of Azimuth at right angles at the point indicated by the Altitude Diff.

Extend this line until it crosses the parallel of Lat. 28° 15′ N. and the Lat. and Long. of this last intersection will be the position of ship.

Namely, Lat. 28° 15′ North
Long. 15° 30′ 23″ W.

REMARKS

The making of plotting charts will be taken up later on. Plotting charts may be purchased from the Government. The next subject will be star sights.

Ans. to problem in last issue is Latitude: 26° 46′ 52″.9 N. Erratum—Make height of eye in March example 50 feet, same as in February example.

FORM COMPLETE FOR SAINT-HILAIRE METHOD AS FOLLOWS:

Date, September 10, 1918. (Ship at anchor.)
Assumed position, Lat. 28° 15′ N.
Long. by D.R. 15° 25′ W.
(A noon sight was taken and Lat. found.)

Data—
Height of eye, 30 feet.
C.C. + $1^m\ 52^s$
C-W = $1^h\ 2^m\ 20^s$
M. Obs. Alt. ☉ was 46° 28′ 13″.3
M.W.T. was $2^h\ 29^m\ 40^s$

W.T.	2^h	29^m	40^s
C-W	1^h	2^m	20^s
Chro.T.	3^h	32^m	00^s
C.C.	+	1^m	52^s
G.M.T.	3^h	33^m	52^s
Eq.t.	+	2^m	$52^s.15$
G.A.T.	3^h	36^m	$44^s.2$
λ	1^h	1^m	40^s
L.A.T.(t)	2^h	35^m	$4^s.2$
Lat.	=28°	15′	
Dec.	= 5°	5′	45″

Obs. Alt.	☉	46°	28′ 13″.3
Corr.	+		9′ 42″
h	☉	46°	37′ 55″.3

Eqt.	+	2^m	$52^s.6$
H.D.	—		.45
Corr. Eq.t.		2^m	$52^s.15$

Dec.	+	5°—5′.3
H.D.	+	.45
Corr. Dec.	+	5′ 5′.75

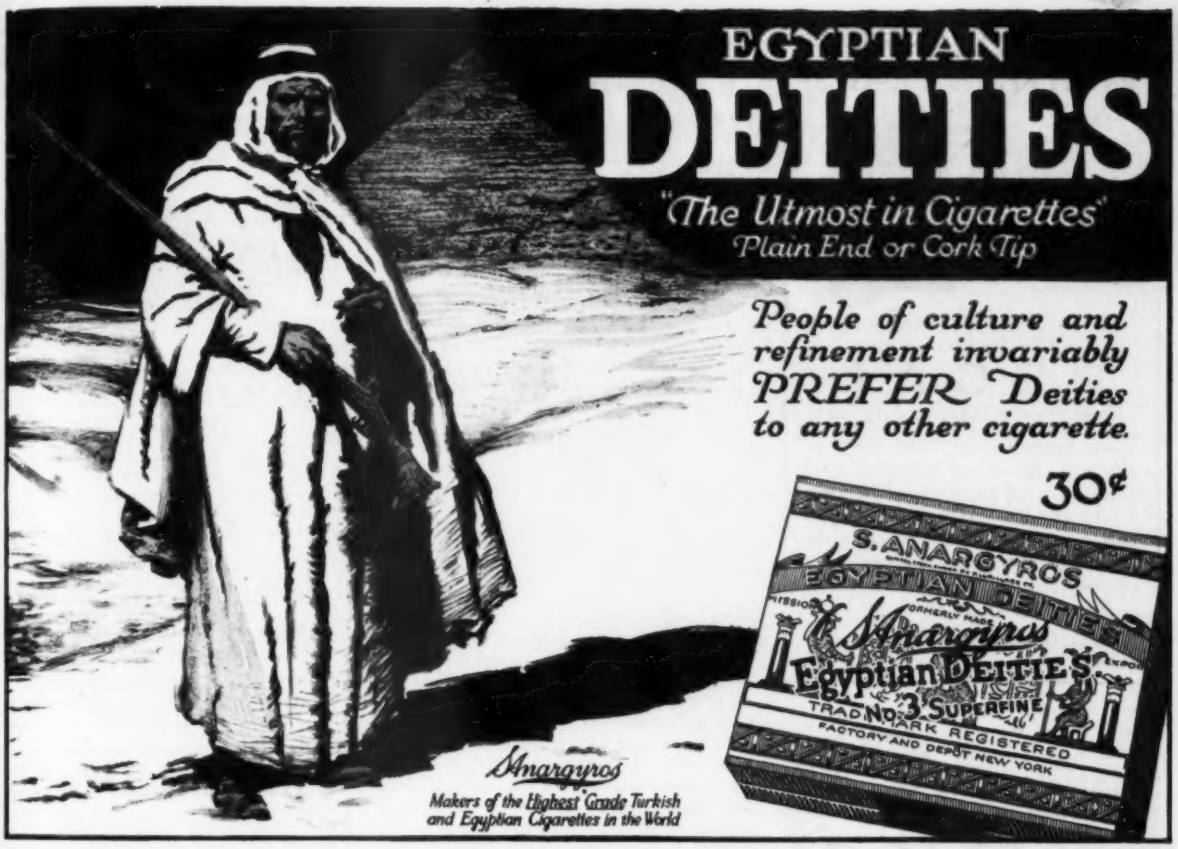
.....Log. Hav. = 9.04198
.....Log. Cos. = 9.94492
.....Log. Cos. = 9.99828

Log. Hav. θ = 8.98518
Nat. Hav. θ = .09665
Nat. Hav. = .04027

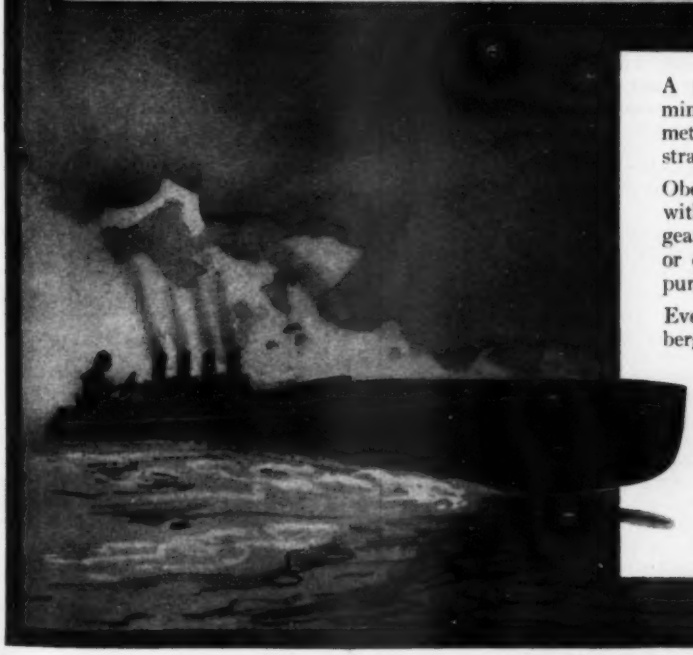
Nat. Hav. z = .13692 = 43° 26′ 5″

Lat~Dec.	23°	9′	15″
	90°	00′	00″
z	43°	26′	5″
Cal. h,	46°	33′	55″
h	46°	37′	55″.3
Alt. Diff.		4′	0″.3

Toward Sun.
Z from tables. N. 115° W.


EGYPTIAN
DEITIES
"The Utmost in Cigarettes"
Plain End or Cork Tip
People of culture and refinement invariably PREFER Deities to any other cigarette.
30¢
S. ANARGYROS
EGYPTIAN DEITIES
TRADE MARK REGISTERED
FACTORY AND DEPOT NEW YORK
Anargyros
Makers of the Highest Grade Turkish and Egyptian Cigarettes in the World

SERVICE FORGINGS



A racing boat—travelling at mile-a-minute speed—subjects every piece of metal in the power plant to a constant strain of unusual severity.

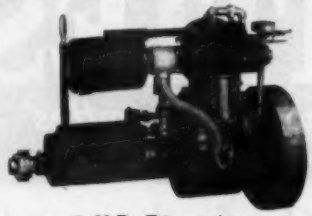
Obenberger Forgings are guaranteed to withstand the terrific stress imposed on gears, propeller shafts, connecting rods or crank shafts when used for marine purposes.

Every forging that leaves the Obenberger plant must do its share to maintain the unblemished reputation of our organization.

Obenberger quality, prices and delivery possibilities will interest you. Let us tell you about them.

John Obenberger Forge Company
West Allis Wisconsin

HAVE BUILT THEM EIGHTEEN YEARS!



7 H.P. EA engine

and during all that time

REGAL

Four Cycle Marine Engines

have been in the first rank of the world's most efficient and reliable boat engines. The long years of successful service that the line has given must substantiate, to some extent, our claim that no better engine is made. Sizes 2 H.P. to 50 H.P.

REGAL GASOLENE ENGINE CO.
74 Pearl St. Coldwater, Mich.

AVOID disaster by using a DIRIGO compass on that boat. All materials first class. No rubber gaskets to rot. A very hard pivot and high-grade jewel. Navy degree circle on dial. Brass and mahogany binnacles. Also new course finder and bearings instrument. Send for descriptive catalog.

EUGENE M. SHERMAN
Box 3 Bellevue, Wash.

Wittemann-Lewis Aircraft Company

Flying Boats & Airplanes

Newark, New Jersey

WICKER-KRAFT
YACHT FURNITURE

Used on the finest boats. Regularly supplied by highest grade boat builders. Wicker-Kraft Chairs, fitted with life belts, are an original Wicker-Kraft idea. Write for illustrated catalog.

WICKER-KRAFT CO., Newburgh, N. Y.

WHITING-ADAMS

That name is all you need to know about the brush. It guarantees highest quality; longest wear, lowest price.

JOHN L. WHITING - J. J. ADAMS CO.
Boston, U. S. A.
Brush Manufacturers for Over 100 Years.

PUMPS

Made by the
Lipman Mfg. Co.

for circulating purposes are the very best. Hundreds of Thousands in use. Send for Catalogue.

233 Pleasant St. Beloit, Wis.

What to Blow and When to Blow It

(*Continued from page* 58)

soon as she is free and clear of the slip she then becomes amenable to the rules of the road and is subject to the same rights and rules as other boats. While the obligation to keep clear of other boats falls upon the ferryboat until she is away from her slip, yet, other craft have no right to block the entrance to the slip in such a way that the ferryboat could not enter or leave her slip without danger to life or property.

In number (2) we have a small motor boat of class I in collision with (3) a motor boat of class III. We also have (4) a motor boat of class II standing by to render what assistance she can to the boats in collision. In a case of this kind the law provides that in case of accident it is the duty of the person in charge of each boat to stand by the other until he is certain that there is no further need of assistance, and it is his duty to render to the other boat, her crew, and passengers, such assistance as may be practical and necessary in order to save them from any danger caused by the collision. He must also give to the person in charge of the other the name of his own craft and the port to which she belongs.

In number (5) we have the familiar case of a tug backing out from a pier, but in this instance she is entirely free and clear of the pier and, therefore, subject to all the rules of the road. In case of a boat backing the proper passing signals to give are exactly the same as though the boat was going ahead and considering that her stern is her bow while there is a backward motion. In other words if boat (5) wished to signal to boat (9) in the diagram that she desired to cross ahead of boat (9) the proper signal for (5) to give would be one blast on her whistle. This signal would be answered by one blast from boat (9) which boat in turn would slow down if necessary to allow number (5) cross her bow.

Number (6) represents an inland steamer and as she is crossing the course of number (9) she has probably already given her the signal of one blast which has been answered by one blast from number (9). As the course of number (6) is also across the course of number (10) the proper method of indicating to number (10) that she wishes to cross her course also would be for number (6) to repeat her signal of one blast as soon as number (9) had answered. The helmsman of number (10) would have heard the exchange of signals between (6) and (9) and would have recognized the second signal as directed to him.

From the preceding paragraph it will be seen that number (6) is in the danger zone of both boats (9) and (10) and, therefore, number (6) has the right of way over these two boats and acted properly when she gave each of them a signal of one blast and proceeded across the bows of these boats.

An ocean-going tug with a tow of ocean-going barges is indicated by num-

(*Continued on page* 64)

Advertising Index will be found on page 140

The Standard Reverse Gear

is now giving supreme satisfaction on more than 30,000 motor boats, large and small. It is a strong, quiet, clean, trouble-proof gear that runs in oil, takes little space and lasts as long as the boat itself.

New Catalogue and prices on application.

Langley Machine & Tool Co.
709 Commonwealth Avenue
DETROIT, MICH.

4 Sizes 1 to 15 H.P. per 150 R.P.M.

GASOLENE ENGINES

4 to 400 H. P.

Heavy Duty and High Speed
Noted for Reliability

MURRAY & TREGURTHA CO.
South Boston, Mass.

Hacker - Kraft - Boats

Most Refined and Efficient Runabouts Ever Produced.

JOHN L. HACKER BOAT CO.
Detroit :: Michigan

PALMER ENGINES

If the demands you make of a power plant are of more than usual severity it will pay you to investigate the qualities that prevail in the Palmer. Built for any duty under any conditions, the Palmer Engine powers many of America's best boats.

PALMER BROTHERS
Cos Cob Connecticut

Gear Pulling Made Easy

Says the Master Mechanic. The Greb Automatic Grip Puller is a One-Man Puller—Quick-acting, strong and simple in the extreme. May be locked in any desired position. A combination of two or three arms. Heavy Duty Size capacity 1" to 18"—Junior size capacity 1" to 7". Two sets of jaws furnished with each size.

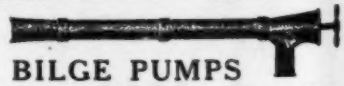
Ten Days' Trial If your dealer or jobber does not have them we will send you one. Try it ten days. If not satisfactory return to us and we will refund your money. We also make the Greb Rim Tool.

THE GREB CO., 225 State Street, BOSTON

MARVELITE
Made with Radium

makes clock and instrument dials glow in the dark. Instrument manufacturers will furnish them Marvelited if you ask them.

COLD LIGHT MANUFACTURING COMPANY,
50 Union Square, New York City.



BILGE PUMPS

Copper or Galvanized Steel—2 to 4 inch diameter—any length. Also Sectional Pumps with removable valve.

Write for prices. Discounts to dealers.

BLUE & QUERIPEL CO., 2360 Third Ave., New York City

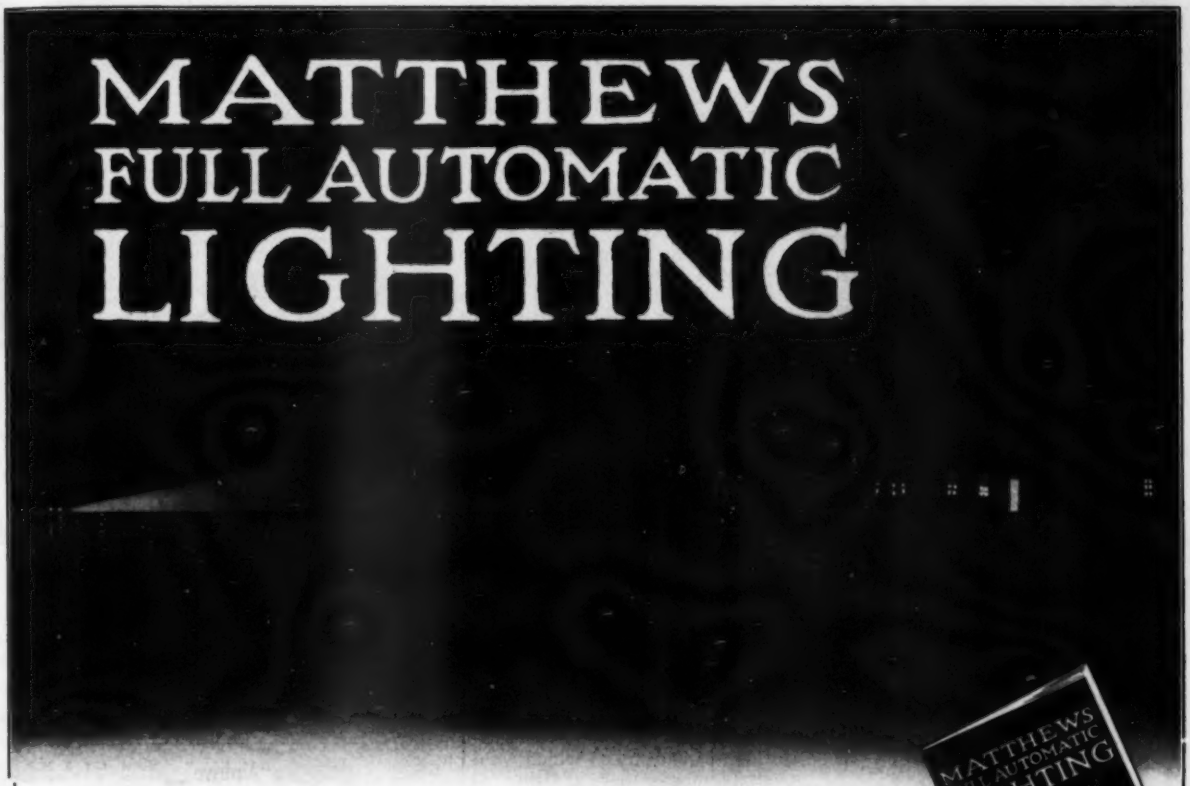
SCHEBLER
CARBURETOR

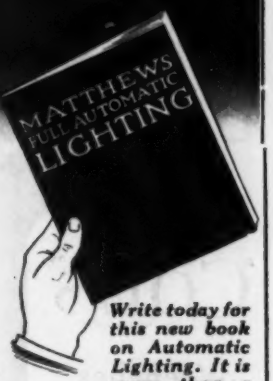
Standard of the World

Consistent Winner of Motor Boat Races

The Wheeler-Schebler Carburetor Co., Inc.
Indianapolis, U. S. A.

MATTHEWS FULL AUTOMATIC LIGHTING





Write today for this new book on Automatic Lighting. It is more than a catalog.

FOR boat houses, cruisers, motor boats, summer cottages, small boat clubs and any other place where electric light and all its advantages are desired.

This is the new Matthews 15 light plant. It is the latest and smallest unit in the Matthews family of Full Automatic Lighting units—and is specially designed for motor boats and boat houses, and summer home use.

Weight 148 pounds, length overall 22½", height overall 18¼", width 10". Runs free from vibration. Supplies 15 lights from generator only and more when battery is drawn on at same time.

This is a 32 volt plant and has not the limitations of 6 and 12 volt service.

Matthews plants are made in 15 light, 50 light, 100 light, 200 light, and 500 and 1000 light sizes and were used by the Government wherever electric light and power were called for, in France, in Y. M. C. A. huts, for search lights, artillery control and for power and light on portable repair shops. Besides, Matthews Full Automatic Lighting Systems were used for auxiliary light and wireless power on all new U. S. transports built by the Shipping Board.

Matthews lighting plants are Full Automatic —start themselves when the load is too great for the battery—start themselves when the battery is partially discharged—and add years to the life of the battery by their automatic features. It will be interesting to you to read the new Matthews book on lighting.

Write for the catalog today.

Matthews Engineering Co.
10 Broadway,
Sandusky, Ohio

"TRADE MARK" COES
REG. U.S. PAT. OFF.

Wrenches Deliver 30% More Service for 5% Greater Cost

Why buy a substitute or an imitation?

AT ALL RELIABLE HARDWARE STORES

COES WRENCH CO.
WORCESTER, MASS.

What to Blow and When to Blow It

(*Continued from page 62*)

bers (7) and (8). While it is a fact that the tow is in the danger zone of number (6) and it is, therefore, up to number (6) to keep out of the tow's way and pass astern of it if necessary, yet from the relative positions of the two boats shown in the diagram and considering the greater speed of number (6) compared with that of the tow, it would be perfectly proper and permissible for the inland steamer to cross the bow and course of the tow. The proper whistle signal, if any, to indicate that she intends to take this action would be for number (6) to give two short blasts. This signal would be answered by two short blasts from number (7) and the boats would pass starboard side to starboard side.

In case of boats number (9) and (10) we have a very familiar situation frequently encountered on many of our harbors and rivers where two boats are running on courses which are practically parallel and for some reason the boats desire to change sides, so to speak. For example, there might be some good reason why number (9) desires to cross to the port side of number (10) or perhaps number (10's) slip or pier might be on the opposite side of number (9) which would necessitate her either crossing ahead or astern of number (9) to reach her objective point. The question arises What signals are to be exchanged between numbers (9) and (10) to indicate their intentions?

This is a situation which is probably less understood and more generally confused than any other, particularly among amateur skippers. Generally the old familiar saying comes to one's mind that one whistle signal indicates that I am directing my course to starboard and two whistles signify that I am directing my course to port. In this instance this rule does not apply and should be eliminated from one's memory once for all. Here we have a case to which the simple rule mentioned at the top of page 58 is the key to the situation. In other words if number (9) desires to cross ahead of number (10) she will pass number (10) on her own port side. This according to the rule explained on page 58 calls for one blast on her whistle, number (10) answers with one blast on her whistle, slows down, and passes astern of number (9).

On the other hand, should number (10) desire to pass ahead of number (9) she will give two blasts on her whistle or the signal that she is going to pass number (9) on her own starboard side.

In a case of two sailing vessels represented by numbers (12) and (13), the former is on the port tack inasmuch as she has the wind over her port bow and number (13) is close hauled on the starboard tack. In a situation of this kind the sailing vessel which is on the starboard tack has the right of way and, therefore, number (13) is a privileged vessel and is per-

(*Continued on page 70*)

Advertising Index will be found on page 140

Sandusky Dinks "the famous Davis Dink to be known from now on as the Sandusky Dink"
The Ideal Tender

For many years the famous "Davis Dink" has been accepted by the boating world as the ideal tender for any boat. Owners of the finest yachts afloat have been among the first to specify "Davis Dinks" when approving plans and specifications.
From now on the "Davis Dink" is to be known as the "Sandusky Dink." The change is in name only—the quality of material and excellence of design will remain the same.
"Sandusky Dinks" are light, strong and serviceable. Both row and power are continually in stock in sizes from 8 to 16 feet. Send for catalog today.
Sandusky Boat & Cabinet Works, Sandusky, Ohio

ATTACH The *Galusha* to your ENGINE

The Galusha Gas Producer
For any Marine or Stationary Engine 18 H. P. or more. Cuts Power Expense 75% to 90%. Light, Compact, Automatically controlled. *Write for bulletin 10*
Nelson Blower & Furnace Co.
Ellicot & L Sts., Boston, Mass., U.S.A.

CROCKETT'S
Spar Composition
—the original and best known exterior marine varnish in the world. The best Interior Finish is Crockett's
NO. 1 PRESERVATIVE
Send for Catalogue
The David B. Crockett Co. Bridgeport, Conn.

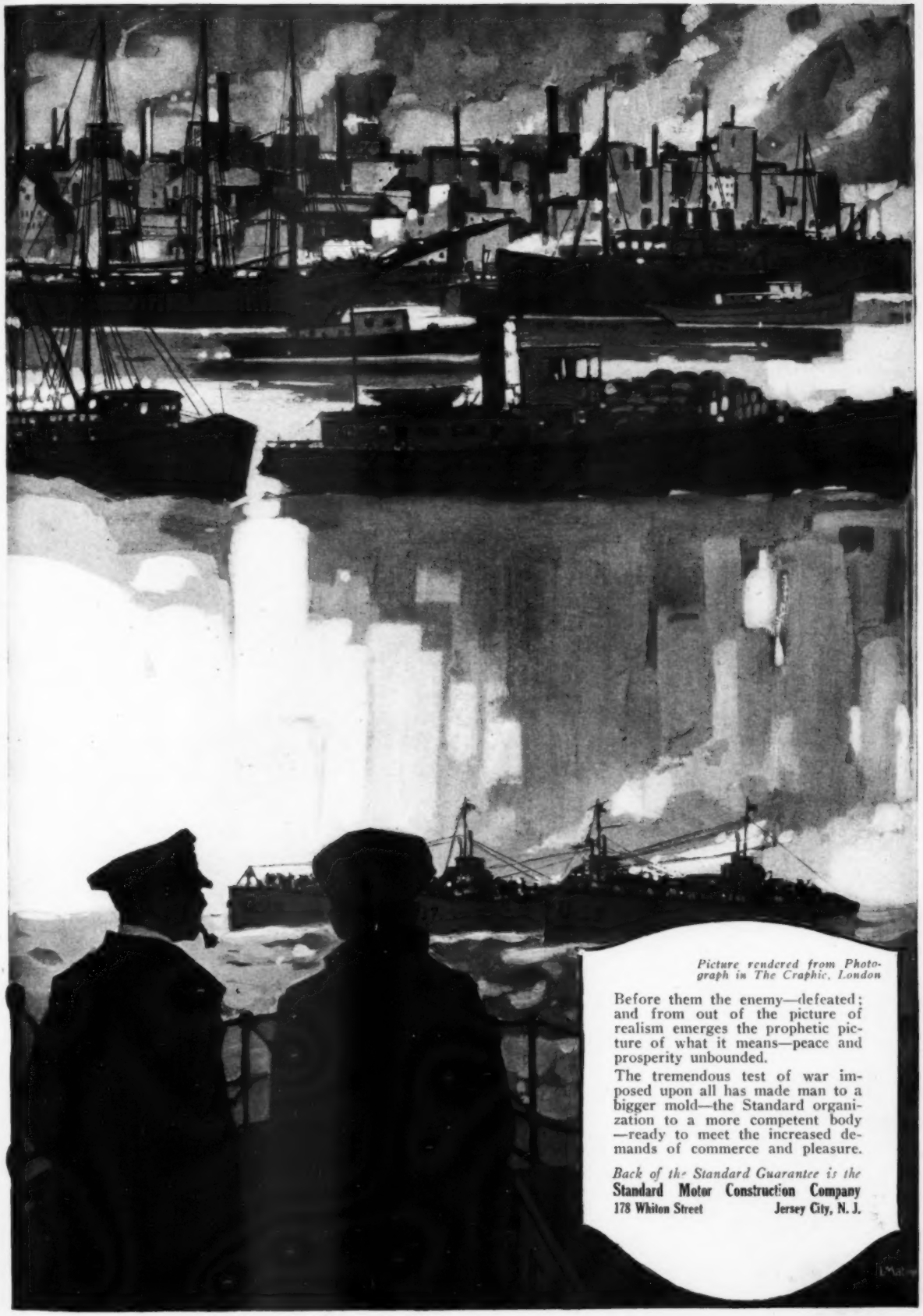
"Airdrive" Model L-2 3 H.P. for canoes, rowboats, Kahlo and hunting boats.
Model M-3 10 H.P. for light commercial use, and pleasure boats.
Model O-4 24 H.P. for work boats up to 30 ton capacity.
An "Airdrive" on your boat will decrease your power troubles, give you more satisfaction, and at low operating expense. Let one prove it for you on your boat.
KEMP MACHINE WORKS
1217 So. Franklin Street.
Muncie, Ind.

SMOOTH-ON
IRON CEMENTS
STOP Steam, Water, Fire or Oil LEAKS
Write for free Instruction Book.
FOR SALE BY SUPPLY HOUSES.
Smooth-On Mfg. Co., Jersey City, N. J.

The Chemical Fire Chiefs Recommend
Fire-Choke Thrown from the hand it instantly extinguishes incipient fires. Two sizes, $3.50 and $5.00. *Send for free sample.*
THE FLEXLUME SIGN CO.
1441-45 Niagara St., Buffalo, N. Y.

IMPROVED THERMEX SILENCER
Increases Revolutions, No Back Pressure!
Cannot clog, nor collect salt; water cannot flow back to cylinder. No heating, no odor. Used free or under water—adjustable discharge. Lightest, cheapest to install. Free booklet shows why. Send for it today.
CENTRAL MFG. CO.,
155 Liverpool St. East Boston, Mass.

BURGER BOATS
COMMERCIAL AND PLEASURE
If you plan to build a new boat this spring it will pay you to get our prices.
We are prepared to furnish any boat up to 200 feet for all purposes and we guarantee satisfaction.
Write for information
BURGER BOAT CO.
Manitowoc, Wisconsin



Picture rendered from Photograph in The Graphic, London

Before them the enemy—defeated; and from out of the picture of realism emerges the prophetic picture of what it means—peace and prosperity unbounded.

The tremendous test of war imposed upon all has made man to a bigger mold—the Standard organization to a more competent body—ready to meet the increased demands of commerce and pleasure.

Back of the Standard Guarantee is the

Standard Motor Construction Company

178 Whiton Street Jersey City, N. J.

Picture rendered from British Ministry of Information Photograph in The Graphic, London

"The Naval Watch on the Rhine"

The Graphic, London

The Standard Engine which was at Zeebrugge-Ostend-Durazzo—on every sea, has penetrated to the very heart of Germany; for these patrol boats are the Elco-Standard M.L.'s

Back of the Standard Guarantee is the

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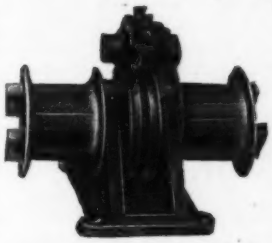
Advertising Index will be found on page 140

TWO OF DURKEE'S D MARINE SPECIALTIES



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ANDRADE GRIP WINDLASS

"THE EELLS" STOCKLESS ANCHOR

Send for circulars for details

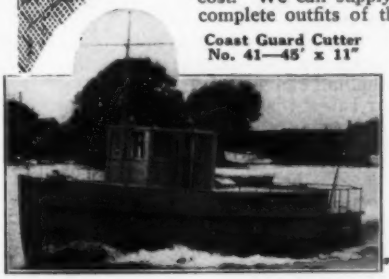
Our 1096 page Catalogue will be sent on receipt of 25 cents to cover delivery

C. D. DURKEE & CO., Inc.
2 SOUTH STREET, NEW YORK CITY
MANUFACTURERS of MARINE HARDWARE
Factories at Grasmere, Staten Island, N. Y. C.

RICHARDSON BOATS

Our plant is admirably equipped to produce high-grade cruisers, runabouts, small tugs and other commercial vessels at the lowest possible cost. We can supply at short notice anything from K. D. frames to complete outfits of the finest kind.

Richardson 25' x 5' 8" Runabout



Coast Guard Cutter No. 41—45' x 11"

When you decide to order that new boat, whether commercial or pleasure, why not let us build it for you? Our workmen are the master craftsmen of the industry and our location gives us the pick of eastern lumber stocks. Richardson boats can be built to order to meet individual requirements. They embody the features you want at prices that are most attractive.

Write to-day for sketches and estimates.

Richardson Boat Company
No. Tonawanda, New York

Improved Motor Boat Closet

Figure 1404

Dimensions: 18 x 18 x 11" high to top of bowl; 2½" cylinder. For above or below water line.

The best little closet on the market today, possessing many of the advantages of the large size toilet. All brass and porcelain. Oak seat and cover.

All prices subject to market advances, which are continually changing.

Price.....$25.00

The J. H. Curtiss Co.

Pioneer Specialists in Marine Sanitary Fixtures

Since our advertisement appeared in the first issue of MoToR BoatinG, December, 1907, hundreds of Curtiss fixtures have been installed in motor cruisers and yachts of all sizes, including some of the finest boats launched within this period.

The Curtiss line is exceptionally complete, varied in type, size and price to meet every possible requirement. Each model has been designed in accordance with our wide experience in boat work and can be depended upon in quality, service and durability no matter whether it is our highest or lowest priced model.

With Pump

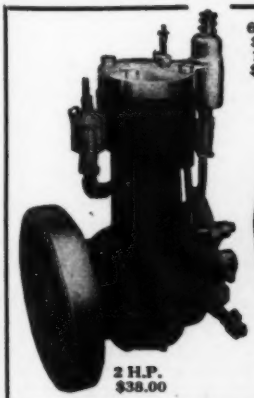
Cock on pump swings upward, thus preventing breaking of bowl. Soap-dish is porcelain and removable.

No. 5
Height, 19 in.
Width, 19 in.
Depth Closed, 8 inches.
Quartered Oak Case, Each, $42.50
Mahogany Case, Each, $44.00

Lining and Fixtures Nickel-plated. Porcelain Bowl. Mahogany or Quartered Oak Case.

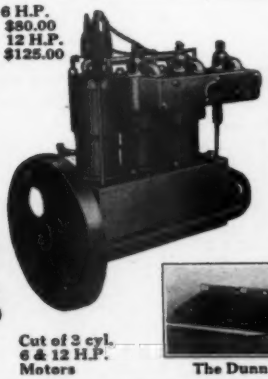
Fig. 1392

THE J. H. CURTISS CO. 2 South Street, New York



2 H.P. $38.00

6 H.P. $80.00
12 H.P. $125.00



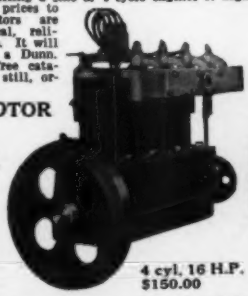
Cut of 2 cyl. 6 & 12 H.P. Motors

The Dunn Factory

Dunn 4-Cycle Marine Motors
1919 Models—Kerosene, Gasolene

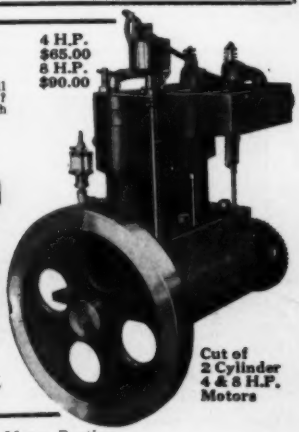
The demand for "Dunn" Motors during 1919 will be even bigger than it has been this past year. Why? Because we are selling a line of 4 cycle engines of high grade, at honest prices to you. Our motors are strong, economical, reliable and durable. It will pay you to get a Dunn. Write for our free catalogue, or better still, order to-day.

DUNN MOTOR WORKS
Ogdensburg, New York, U.S.A.

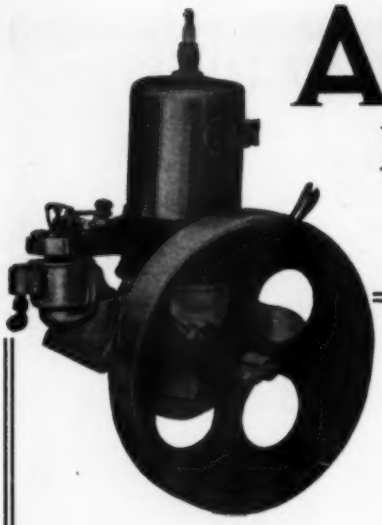


4 cyl, 16 H.P. $150.00

4 H.P. $65.00
8 H.P. $90.00



Cut of 2 Cylinder 4 & 8 H.P. Motors



ARROW
Light Weight Inboard Motors

Reliable and Efficient

Sturdy construction without undue weight; maximum power with minimum consumption of gas; these are two of the important features found in the famous Arrow-Waterman Model K's.

These little engines, built in either one or two cylinder types, are just the thing for tenders or other small boats where space and weight limitations are confronted. The Arrow-Waterman light weight inboard motor is being used by many boatmen whose problems include a lack of space for the power plant.

The Model K-2, for instance, weighs only 60 lbs., and may be installed in an ordinary rowboat without any preparation by anyone who is handy with tools. The lack of vibration will surprise you—notwithstanding the fact that this model develops 5 h.p. Built in our own factory it comes to you with a guarantee as to the quality of material and workmanship put into it. A reliable 2 cylinder engine equipped with aluminum crankcase and copper water jacket.

The single cylinder model (K-1) is a 2½ h.p. motor weighing only 36 lbs., that performs consistently day in and out. It is especially suitable for installation in canoes and very small rowboats.

Arrow-Waterman Motors offer you every desirable feature in small boat power plants. They may be seen at any time at our factory or a descriptive catalogue will be sent upon request.

ARROW MOTOR & MACHINE COMPANY, Inc.
632 HUDSON TERMINAL BUILDING
NEW YORK CITY NEW YORK
Foreign Office, 47 Broadway, N. Y. C. J. E. Sitterley, Foreign Sales Mgr.

MoToR BoatinG

is always necessary and valuable but never more so than in April and May, when the boats are going over for the season. It solves those problems that come up every day when fitting out—it overcomes those little snags that delay the completion of the job. Use MoToR BoatinG as your helpmate—it is never in the way like many well intentioned friends and its advice is always trustworthy.

Send your subscription now—$2.00 per year.

Get the details of our 18-foot V Special 2½ H. P. ready to run. Price $250. Plans of other sizes on request.

Rider & Suydam
353 West 37th Street New York, N. Y.

E. J. WILLIS CO.

Don't wait until you are in urgent need of some supplies or hardware for your boat. Write today for our illustrated catalog, study it carefully, compare the prices with what you have to pay elsewhere and then send us your order for what you need. We will ship it promptly from our large and complete stock, and save you both time and money.

No matter what you want in the marine line, if it is sold anywhere in New York City we will get it for you and ship it the same day your orders is received. Give us a trial.

Write today for Catalog "B"
Sent anywhere free on request.

85 Chambers Street, N. Y. City

Advertising Index will be found on page 140

A Mark Boat That Will Mark

(*Continued from page 19*)

A flash cone is shown on the plan. This has been used in the yacht racing game, but it is practically unknown to the motor boatman. The cone is a conical shape, generally made of sheet tin and discarded when the surface gets dull. A permanent cone can be made of sheet monel metal and polished on a buffing wheel the same as brass fittings. This can always be kept bright.

In a long race, where the marks are out of sight, and the day is sunny and hazy, this cone will reflect a flash like a heliograph, which can be seen before the mark and calls attention to its location, thus enabling a contestant to ascertain sooner than otherwise whether he is heading straight on the course.

For cruiser racing the cone would probably help, but for speed boats on a rather short course their value is yet to be determined. However, it would be interesting to try them out, as they might prove useful, especially in hazy weather, and their presence could do no harm.

The sides of the boat should be painted a very dark gray, as sometimes the hull can be picked up in hazy weather easier than the ball. Paint the deck light gray and the bottom to 3 inches above the water with anti-fouling composition. Paint the boat's number in white at the bow.

A mushroom anchor is the best mooring and should weigh 30 to 40 pounds, depending on conditions. The cable should not be over one-half inch, as a heavier one would tend to pull the bow down in a strong running tide.

This mark boat should be satisfactory for distances up to 3 or 4 miles, and if well and truly made and taken care of will last many years.

My Ideal Auxiliary, Bonita

(*Continued from page 36*)

and motor boats and the inspection of many boats and designs.

I put on the ketch rig so as to make the handling and shortening of sail easy for one man and to have it all inboard as much as possible.

This boat is plenty large enough for my wife and myself to cruise in or to take a few friends out for a day's sail and for those dandy fishing trips outside which we have learned to like so well.

The principal dimensions of the hull are 29 feet 6 inches overall, 25 feet waterline, 9 feet beam, and 4 feet draft. A long iron casting is bolted on the keel which greatly strengthens the backbone as well as lowering the weight and several iron blocks are well spread out under the flooring.

The fittings and furnishings are plain but in keeping with the rest of the outfit. Most everything that a sail boatman and a power boatman needs will be installed with the possible exception of a separate galley or a coal range and I have found out that both of them are not really necessary to the pleasure of yachting and cruising, especially if the crew is as small as I think it will be aboard "My Ideal Auxiliary."

"New Jersey" Copper Paint

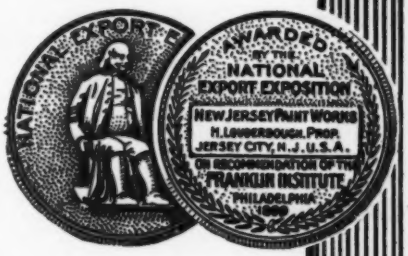
"New Jersey" Marine Specialties

BROWN COPPER PAINT	YACHT RED COPPER PAINT	YACHT WHITE
YACHT GREEN COPPER PAINT	SARGASSO GREEN	YACHT BLACK
BRIGHT GREEN COATING	ANTI-CORROSIVE AND ANTI-	SHIP & DECK PAINT
ELASTIC SEAM PAINT	FOULING PAINTS FOR IRON	MARINE MIXED PAINT
MASTINE FOR MASTS	VESSELS	SMOKE STACK PAINT

New Jersey Concrete Paint Ready Mixed for Use

The most valuable asset we possess is our reputation and every "New Jersey" product is manufactured with this principle in mind. Boatmen throughout the United States recognize in our paints that superiority that comes with years of experience plus perfect formulas.

Proofs of "New Jersey" Superiority



New Jersey Liquid Metal Polish

A speedy cleanser that brightens up the metal work, whether hot or cold, and results in a lasting finish. Unexcelled for use on brass, nickel, tin, copper, zinc, or other metal parts of the boat. Put up in a variety of convenient sizes for the marine trade—¼ pint, ½ pint, pint, quart, ½ gallon and gallon cans.

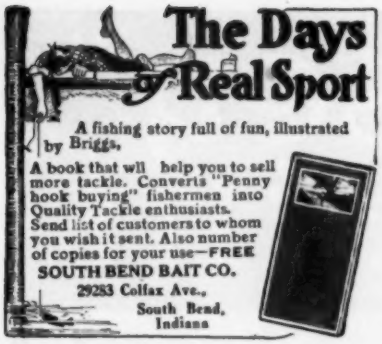
"New Jersey" Spar Varnish

is a varnish made especially for marine use. It dries quickly which is important when yachts and other craft are lying in a dust-laden harbor. It does not crack, turn white or crawl and is very easily applied due to its smoothness.

"New Jersey" Interior Finish

Bertram's Oil Polish is the very best interior boat finish on the market. It is non-explosive and non-burnable, rendering its use safe in any location. It has for years enjoyed the complete confidence of those who require something better than usual.

NEW JERSEY PAINT WORKS
Harry Louderbough Inc.
Jersey City Long Distance Phone New Jersey
Cable Address "Jersey" Jersey City, N.J., U.S.A. Western Union Code


The Days
Real Sport
A fishing story full of fun, illustrated by Briggs.
A book that will help you to sell more tackle. Converts "Penny hook buying" fishermen into Quality Tackle enthusiasts. Send list of customers to whom you wish it sent. Also number of copies for your use—FREE
SOUTH BEND BAIT CO.
2923 Colfax Ave., South Bend, Indiana

GIES REVERSE GEARS
RADIATE SATISFACTION
Three Models. Write for Prices.
GIES GEAR COMPANY
47 Fort Street East Detroit, Michigan

Euclydes de Souza Lima
Agent for engines and various kinds of machinery.
P. O. Box 254
MANAOS, AMAZONAS
North Brazil South America

THERE'S SAFETY AFLOAT WITH PYRENE IN THE BOAT
Pyrene
KILLS FIRE SAVES LIFE

INTEGRAL CAMSHAFTS
We make them for the leading builders of marine, airplane and automobile motors. We are Integral Camshaft Specialists, insuring the utmost in quality of workmanship and materials, accuracy and uniformity.
Let us quote on your designs.
MUSKEGON MOTOR SPECIALTIES CO.
Muskegon, Mich.

SAVE GASOLINE
Get More Power. Greater Speed. Smoother Operation. Longer Service. New Stromberg Carburetor for Marine Engines "does it."
Write—Give motor specifications, name boat and engine, number of cylinders, bore and stroke.
STROMBERG MOTOR DEVICES CO., Dept. 444
64 E. 25th St., Chicago, Ill.

POLARINE
The Standard Oil For All Motors
Standard Oil Co. of New York

Baldridge Reverse Gear
You can get a Baldridge — the original all-enclosed, time-tested reverse gear—now—for immediate delivery.
Booklet "For the Man in the Boat." Free.
THE BALDRIDGE GEAR CO. Boston, Mass.

Yard and Shop

(*Continued from page* 46)

Harvard's Nautical Course

The Harvard University Summer School, which is to have two sessions, one from July 1 to August 9 and the other from August 11 to September 13, is to include in its courses of instruction one in Nautical Astronomy.

(*Continued on page* 106)

What to Blow and When to Blow It

(*Continued from page* 64)

mitted to cross ahead of number (12). In no cases do sailing vessels sound any passing whistle signals.

In the case of boats (16) and (18), we have the former a slow-going tug and the latter number (18) a fast motor boat. While it might appear upon first thought that number (18) had the right of way yet upon closer examination it will be seen that number (18) is approaching the course of number (16) from more than two points abaft number (16's) beam. In other words, number (18) is strictly speaking an overtaking vessel and it is, therefore, her duty to keep out of the way of numbers (16) and (17) by going astern of them or taking whatever other action that is necessary. Naturally, numbers (16) and (17) being the boats having the right of way, they will maintain their course and speed and will not be influenced in any way by the course or actions of number (18).

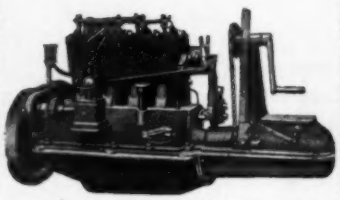
In the case of number (18) and (10) we have number (18) overtaking number (10). In this case it is number (10) which has the right of way and should (18) desire to pass the ferryboat on number (10's) starboard side she will ask permission to do so by blowing one blast on her whistle. Provided number (10) is willing to grant this request to allow number (18) to pass on her own starboard side she will give the assenting answering signal of one blast on her whistle. However, should number (10) deem it unwise or unsafe for any reason whatsoever to allow number (18) to pass she may refuse permission by giving the danger signal of four or more short blasts. In such a case it is the duty of number (18) to stay astern. Similarly, should number (18) desire to pass on number (10's) port side she may ask permission by blowing two short blasts on her whistle which if assented to by number (10) will be answered by two blasts.

In number (19) we have our familiar friend a fishing vessel at anchor. Fishing vessels have certain rights which must not be disregarded. Such vessels have a right to fish in waters other than channels or where they will obstruct navigation. Where a vessel chooses to fish in waters which do not make such a vessel a menace to navigation she must not be disturbed. In other words, passing vessels must give her a wide berth and exercise care that they do not disturb her fishing operations.

Advertising Index will be found on page 140

Universal

America's Classiest Small Motor



9-12 H.P.—4 Cyl. 4 Cycle—300 to 1600 R.P.M.

For Speed, family, small launches, fishing or life boats, yacht tender, etc.

All Over the World

they're becoming the accepted standard—from Greenland's icy mountains to India's coral strand—the orders come through the sort of word of mouth advertising that pleased owners are so quick to spread abroad.

For the boatman who requires the maximum in unusual service, with the minimum fuel consumption and upkeep attention, the Universal is the sure, best buy on the market.

Find Out All About It Now
Send for Bulletin No. 29

UNIVERSAL MOTOR CO.
OSHKOSH, WIS.

LYKNU POLISH
WILL MAKE YOUR BOAT JUST LIKE NEW

KEYLESS RADIUM DIAL CLOCKS
The ideal clock for every motor boat, cruiser and yacht. The Radium Dial makes the hands and numerals visible at night.
Adopted by the U. S. Navy for Airplanes.
Price $15.00. Other clocks from $2.50 to $6.00.
Write for details and prices.
Keyless Auto Clock Co., 246 West 59th St., New York City.

WE CAN MAKE PROMPT DELIVERY OF NEARLY ALL SIZES OF THE FAMOUS
EMERSON 2 CYCLE 4 PORT
AT THE OLD PRICE
HERFURTH ENGINE & MACHINERY CO.
Alexandria, Va.

14 Troublemakers Eliminated

NO

Carburetor	Timers
Magneto	Wires
Batteries	Switches
Spark Plugs	Hot Ball
Ignitor	Hot Tube
Ignition Points	Hot Torch
Coils	Fuel Pump

Especially adapted to use in Cruisers, Power Boats, Launches, Fishing Boats, and the smaller commercial craft.

Quayle

Run at 600 r.p.m., for semi-heavy duty work, and at 300 to 350 r.p.m. for strictly heavy duty work.

Oil-Burning Marine Engines

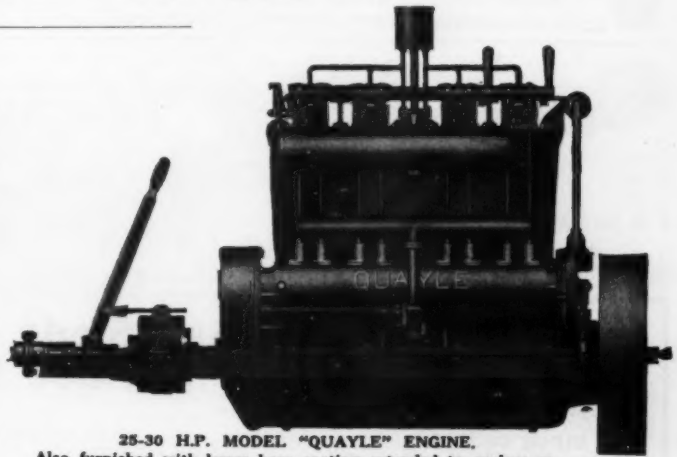
(Hvid Type)

The "Quayle" is the only engine on the market to-day that exemplifies perfection in oil-burning marine power plant construction. The elemination of fourteen troublesome parts results in a motor that is so simple in operation and construction that anyone can readily understand it. The "Quayle" starts and runs on any of the heavier free-flowing oils such as kerosene, solar oil, vegetable oil, crude oil, fish or fuel oil. *It burns every atom of the fuel* and it gives every ounce of power from either one of them. It starts just as easily in cold weather as it does in warm.

Pays for Itself in 300 Days

The "Quayle" is truly an invertment because it pays for itself in 300 working days. The saving in the cost of the fuel is so great that you can travel twice the distance at half the price. In these days of high-priced gasoline this feature is one of the first features that appeals to the thoughtful boat owner. It cuts the cost of operation to less than one half.

The "Quayle 25" is "Get-at-able". The removable cylinder walls, the removable main bushings and connecting rod bushings, in fact all parts subject to wear are readily accessible and can be easily and quickly replaced. It is no trouble to keep this engine in perfect operating condition.



25-30 H.P. MODEL "QUAYLE" ENGINE.
Also furnished with lower base casting extended to enclose reverse gear, and thrust bearing, making engine, reverse gear and thrust bearing one assembled and completely enclosed unit.

Let us send you the facts about it.

Commonwealth Motors Co.
326 W. Madison St.
Chicago :: :: Ill.

ZUNDEL

SEE US FIRST

Before you buy marine equipment of any kind come in and get our prices. We carry the most complete assortment of motor boat supplies in New York.

Best Quality—Right Prices

Every item we handle is warranted to be supreme in point of quality and our prices are always as low or lower than you find elsewhere. Special attention given to commercial, export and mail orders.

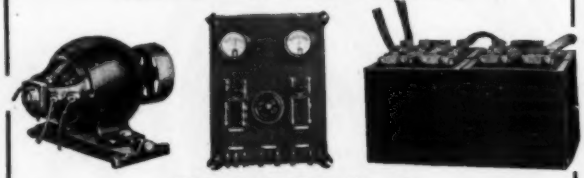
Write for catalog to-day—it's free

R. W. ZUNDEL CO., Inc., 47 Whitehall St., New York City
Phone: Bowling Green 9157

BOAT SUPPLIES

Dayton

Twenty-Light Outfit
(240 Candle Power) 32-volt System

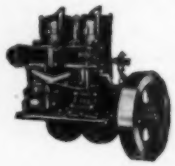


Write for Bulletin No. 60

The Dayton Electrical Mfg. Co.
Dayton, Ohio, U. S. A.

REX

MEDIUM DUTY TWO CYCLE
TWO PORT
and
COMBINED TWO-THREE PORT
1 to 4 CYLINDER
6 TO 32 H.P.



CATALOGUE FREE

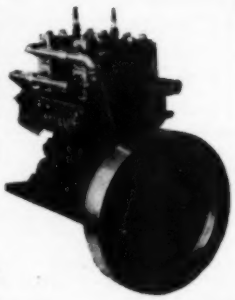
NE PONSET ENGINE & MACHINE CO.
Neponset, Boston, Mass.

Its The Perfected Superior

Its the greatest advance of a decade in design.

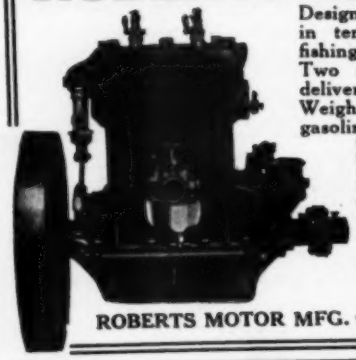
Its mechanically operated intake valve makes it the equal of four-cycle motors in economy, reliability and flexibility, and its remarkably sturdy construction gives it even more than the average two-cycles ability for hard work.

Its built with 1, 2, 3 and 4 cylinders. 6 to 24 H.P.
Find out about it.



Superior Motor Works
Jackson, :-: Mich.

ROBERTS MOTORS



Designed especially for use in tenders, runabouts or fishing boats up to 25 feet. Two cylinder, four cycle delivering 5 to 8 h.p. Weight only 178 lbs. Burns gasoline, kerosene or distillate. Embraces all the features that have made the name of Roberts famous wherever marine engines are used. Guaranteed to give perfect satisfaction.

PRICE $110
Full Engine Equipment
Write for Details

ROBERTS MOTOR MFG. CO., Sandusky, Ohio

Battery Dead—No Lights!

If you had *only known* that your battery was going dead! But there is one sure and dependable way of knowing whether your generator is working and your storage battery receiving its proper charge. Put a

Weston
Model 301 Ammeter
On your Bulkhead

and you will have the only absolutely reliable means of knowing whether you are maintaining the proper condition of your battery. Easy to install. Don't fool with substitutes. Write us!

Weston Electrical Instrument Co.
28 Western Avenue, Newark, N. J.
Branch Offices in the Larger Cities.

FINISHED CRANK SHAFTS

P. H. GILL & SONS FORGE AND MACHINE WORKS, BROOKLYN, N. Y.

We are furnishing them to some of the leading marine engine builders. Carbon and Alloy Steel, Heat Treated to your own specifications. We grind all Pins and Bearings. Forged, machined, and finished complete in our own plant. Let us quote you.

High Speed Sea Sleds and Surface Propeller Boats

THE VIPER CO. Ltd.
Pictou, Nova Scotia

MURRAY & TREGURTHA CO.
340 West 1st Street
South Boston, Mass.

Advertising Index will be found on page 140

Built by

LUDERS

The Last Word in Yacht Designing and Building

Luders Marine Construction Company

Stamford, Conn.

DELAWARE MARINE MOTOR

"The Engine that Gives You More Room in Your Boat"

Completely **ENCLOSED** and **SELF LUBRICATING** with **ACCESSORIES BUILT IN,** yet **ACCESSIBLE** all over

20-40-60-H.P.; 2-4-6-CYL.; 4-Cycle **VALVE** in **HEAD** Marine Engines

Burn Gasoline or **KEROSENE**

Medium Duty SIZE and WEIGHT. Heavy Duty RELIABILITY

We give personal service and Guarantee Results. We have come to stay.

WRITE for Complete Catalog TODAY

DELAWARE MARINE MOTOR COMPANY **2 Commerce Street, Wilmington, Del.**

The pleasures of boating enhanced by the feeling of Security one enjoys if your Craft is protected by *GOOD WOOLSEY PAINT and VARNISH—TOP and BOTTOM.*

WOOLSEY COPPER PAINTS

AND

MARINE PAINT SPECIALTIES ARE THE WORLD'S STANDARDS

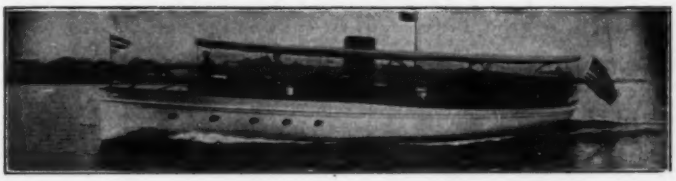
Copper Paints—Brown, Red and Green, Yacht White, Deck Paint, Marine Mixed Paints, Metal Bottom Paint, Seam Paint, Seam Compounds, Sparon (Spar) Varnish, Engine Enamels, Canoe Enamels, Boat Bottom Seam Compound, etc., etc.

C. A. WOOLSEY PAINT & COLOR CO., Jersey City, N. J., U. S. A.

Send for our Marine Booklets, Free—Contain Color Spots and information "How to Paint a Boat."

20th CENTURY Gasoline Motors

2-Cylinder—6½" x 8½"—15-20 H.P.—400 R.P.M.
4-Cylinder—6½" x 8½"—40-50 H.P.—400 R.P.M.
6-Cylinder—6½" x 8½"—65-75 H.P.—400 R.P.M.
Strictly high grade four-cycle engines, built for heavy duty service.



65 ft. x 14 ft.—JINETTA—J. H. Becker

Most yachtsmen know of the satisfaction given by yachts designed, built and powered by us; our experience is at your command; plans on file of all size yachts.

Send Us Your Inquiries

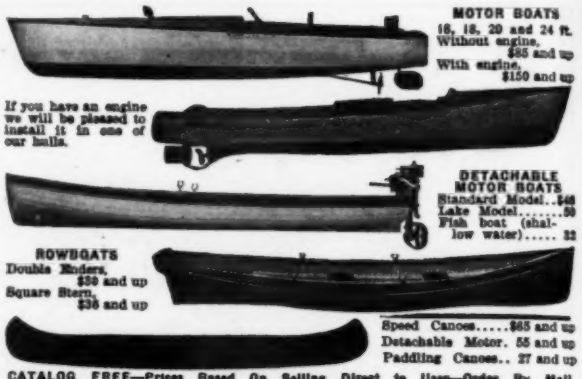
NEW YORK YACHT, LAUNCH & ENGINE CO. :: **Morris Heights, New York City**

BOAT LETTERS AND NUMBERS

Cast brass 3" boat letters and numbers in above style to comply wtih Government license specifications, each letter drilled and furnished with screws ready to fasten on boat. Letters can be finished in polished brass or plated nickel, silver or gold.

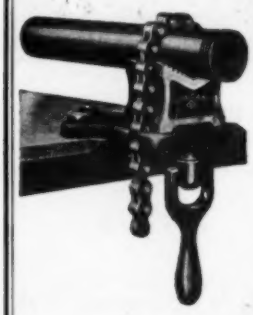
Prices from 30 cents a letter up.

H421 The W. H. Chapman Co.
Founded 1875 Middletown, Conn.


MOTOR BOATS
16, 18, 20 and 24 ft.
Without engine, $85 and up
With engine, $150 and up
If you have an engine we will be pleased to install it in one of our hulls.
DETACHABLE MOTOR BOATS
Standard Model...$48
Lake Model.....50
Fish boat (shallow water)..... 32
ROWBOATS
Double Enders, $30 and up
Square Stern, $36 and up
Speed Canoes.....$65 and up
Detachable Motor. 55 and up
Paddling Canoes.. 27 and up

CATALOG FREE—Prices Based On Selling Direct to User—Order By Mail. Please state what kind of boat you are interested in, we can meet your requirements in PRICE, QUALITY and DELIVERY.

THOMPSON BROS. BOAT MFG. CO., 1910 Ellis Ave., Peshtigo, Wis.



Williams' "Vulcan" Drop-Forged Chain Pipe Vise

Unbreakable
Grip powerful
Readily adjusted
Attachable anywhere

3 sizes—⅛ to 8" Pipe

Booklet free

J. H. Williams & Co.
108 Richards St., Brooklyn, N. Y.
108 S. Clinton St., Chicago, Ill.

Sonora Portable

THIS is the ideal light weight phonograph for you. It plays all makes of disc records, all sizes perfectly without extra attachments and has the famous Sonora tone.

Weighs only 15 pounds, complete. Price, $60

Sonora Phonograph Sales Company, Inc.
George E. Brightson, Pres.
279 Broadway, New York
Demonstration Salon: Fifth Avenue at 53rd Street.

America's Finest Motor Boats

Whatever you want—Runabout, Speed Boat, Cruiser, Rowboat or Canoe.

There's a Racine Wis Made for you

—or we will design and build one to meet your needs.
Tell us the type of boat in which you are interested and we will mail you our special catalog immediately.
RACINE BOAT COMPANY, 1812 Clark St., Racine, Wisconsin

Kaiser Self-Locking STEERERS

Patented

Best Steerers Lowest Cost All Types In Stock

Price, $40 Complete

Effect great economy in use. Positive control — no back lash. Installed in DISTURBER IV

We also manufacture All Cast Bronze Concealed Wire Searchlight with Patented Control. Rope Steerers. Marine Fittings

GEO·B·CARPENTER & Co. 440 Wells Street Chicago, U.S.A.

TO FLAG USERS

Our customers tell us we make the best flag on the market.

They report at least 50% more service from "Raven Brand" flags.

50% more service would mean a considerable saving to you in one year.

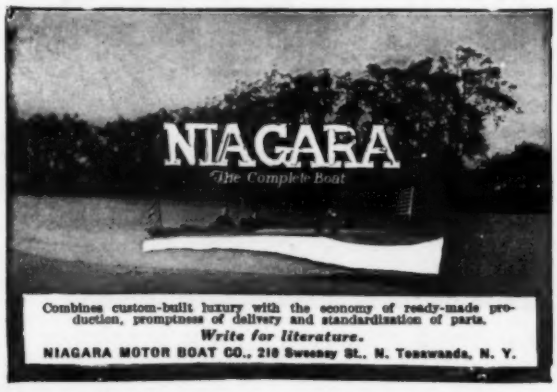
Why not make a little experiment and get your own facts?

Get two flags of the same size, one made by us and the other the best flag you have ever used heretofore. If possible fly them on twin poles simultaneously, but if this is not practical, use them in alternate daily shifts.

We make flags for outdoor service and we are willing to have our flags judged by the amount of outdoor service they will give.

Practically every first class ship chandler on the Atlantic Coast handles "Raven Brand" flags. If your dealer does not handle them, let us know and we will send you the name of a dealer in your city who does.

BETSY ROSS FLAG CO., Inc.
Day Line Dock Newburgh, N. Y.



Combines custom-built luxury with the economy of ready-made production, promptness of delivery and standardization of parts.

Write for literature.

NIAGARA MOTOR BOAT CO., 210 Sweeney St., N. Tonawanda, N. Y.

Advertising Index will be found on page 140

CAPE COD SHIPYARD

COMMERCIAL or PLEASURE CRAFT
up to 150 ft. length
and smaller boats of standardized model built by

CAPE COD
POWER DORY COMPANY

Our Leader 20 ft. Special. The safest little family boat built. Will stand the ocean waters. Motor housed in.

OTHER BOATS WE BUILD

28 ft. Cruiser
14 ft. for Out-board Motor
17 ft. Club Sailing Dory
16 ft. Shallow Draft
10 & 12 ft. Rowing Skiffs

Factory—Wareham, Mass., 367 Main St., Tel., 5-6
Showrooms at 412 Eighth Ave., N. Y. City

JONES
MOTOR BOAT TACHOMETER
A NECESSITY ON EVERY BOAT.

Flush Mount Type

Retail price reduced over 50 per cent due to large production. Finest instrument on the market at a price now within reach of all. Complete —ready to install. Descriptive booklet on request.

JONES-MOTROLA, INC.
29-33 West 35th St., NEW YORK CITY.

LOOK

Can you equal these prices? Class I outfit consisting of Bow Combination Light, Stern Light, Life Preserver Pillow, Fire Extinguisher and two tone Horn complete. Guaranteed to pass Government inspection, $4.50.

Pol. Brass Bilge Pump....	$2.10
12" Steering Wheel.....	1.40
Brass Fog Bells.....	1.20
Two tone pol. brass Horn..	.90

Class II Equipment $10.00. Complete catalogue on request.

UNIVERSAL MOTOR BOAT SUPPLY CO.
Atlantic Highlands, N. J.

TOPPAN
BOATS FOR DELIVERY

The Toppan Co. have completed their Government orders and are now finishing several hulls on which early delivery can be made. Among these are the following:

35 x 9 ft. Raised deck cruising launch ready for motor, $1250.
22 ft. dory launch, 6 H.P. Palmer, $675.
26½ x 6 ft. Govt. Launch, 20 H.P., long deck, mahogany finished, auto control, $1950.
30 x 7 ft. Govt. Launch, 20 H.P., open boat, $1750.
20 ft. lapped straked dory, 4 H.P., $375.
21 ft. sailing dory with sails and equipment, $290.
18 ft. Riverside sailing dory with sail, $150.
14 ft. sailing dory complete, $75.
15 ft. motor skiff ready for engine.
14 ft Hydroplane Bullet, 12 H.P., Universal 16m, $750.
2 24 x 7 U. S. N. Life Boats, 23 capacity, $675.
Also two 18 ft. Power Dories, 3 H.P., motor, best sea boat of its length built, $275.
100 skiffs and bank dories, $2.50 per foot and up.

ORDER EARLY

TOPPAN BOAT CO.
Dept. M. Medford, Mass.

The SENSIBLE Safety Suit

The only ventilated and sanitary Safety Suit on the market. Winter or Summer, in the water, on land or high in the air,—it gives warmth and comfort with perfect protection against drowning or exposure. And you cannot become too warm, literally bathed in perspiration, as with all other air-tight and water-tight safety suits.

The Sensible Safety Suit permits the utmost freedom of movement and is therefore most practical for navigators, aviators, hunters, duck shooters, fishermen, and others. No lead weights in feet or legs. The life preservers can be quickly removed. Entire suit donned in less than a minute.

Demonstrated and Sold at

NEW YORK CITY

Abercrombie & Fitch Co., Madison Ave. at 45th St.
Brokaw Bros., Broadway at 42nd Street
Browning King & Co., Broadway at 32nd St.
Philadelphia, Pa. and Washington, D. C.
Jacob Reed's Sons

Write today for full details to

ALFRED VARLEY SIMS, General Sales Agent

2 Rector St., New York City Phone: Rector 7565

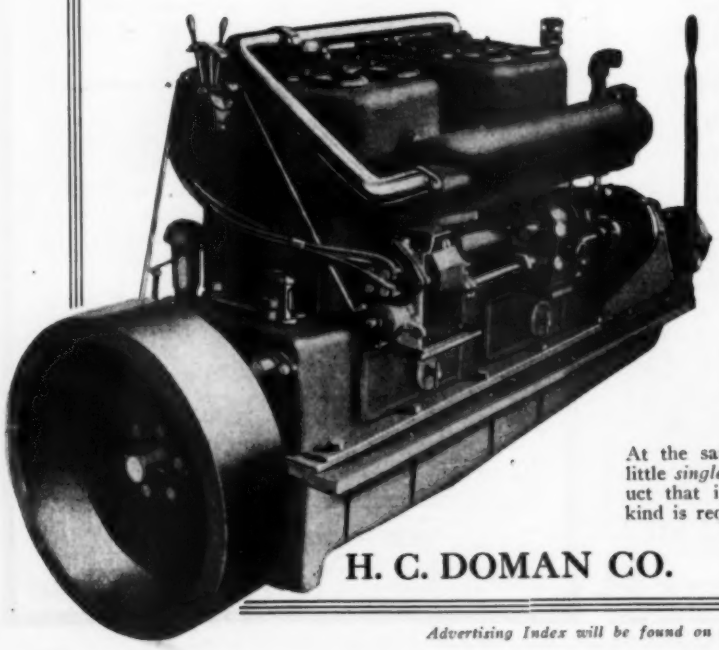
MATTHEWS CRAFT

ASK ANY OWNER

"Quality without Extravagance"

The Matthews Boat Co. MARINE RAILWAYS STORAGE BASIN and WORKS **Port Clinton, O.**

The DOMAN *An Engine of Exceptional Merit*



THE new model "H-M" DOMAN is meeting with ready approval from thousands of boatmen who are making new engine installations for the coming year.

Of course there is a reason for it. The model "H-M" is *designed right—made right —runs right* and *looks right.* It is a medium duty power plant with many features adapting it especially for use in small cruisers, workboats, runabouts, etc. It is the most readily accessible engine ever placed on the market—what few adjustments are necessary are so easily made that it takes but a minute or two to make them. You too, will be pleased with the new model DOMAN.

Our new bulletin about this motor is ready for immediate distribution. Send for a copy to-day—it gives complete details and specifications.

At the same time ask us for information about our little *single cylinder fish boat engine*—a DOMAN product that is popular wherever a power plant of this kind is required.

H. C. DOMAN CO. Dept. C **Oshkosh, Wis.**

Advertising Index will be found on page 140

DREADNAUGHT SAFETY SUIT

The most improved Life Preserving Garment. Has NO frames, draw strings or mechanical contrivances to delay or confuse. Adjusted in less than one minute. Keeps YOU Afloat even if unconscious in upright position, chest high out of water, Warm and Dry indefinitely.

SAFETY-AT-SEA CORPORATION
1358 Broadway, cor. 36th St.
New York

APRIL						
S	M	T	W	T	F	S
..	..	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	..	..	..
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Now Is the Time

Now is the time—before the boat is placed in the water—to see that everything is in the best of condition. Now is the time to see that all seams are tight, that canvas is fast to its base and that the boat is painted well so that it will withstand the action of the water.

MARINE NUPRO REGISTERED **PRODUCTS**

will make this work easy for you. Every one of our products is warranted to be the best that brains and science can produce. Our line embraces everything in the way of marine paint, glue or cement.

Anti Fouling and Copper Paint

Nupro anti fouling and copper paints are two of our products that have earned a wide reputation for their goodness. Both are put up in convenient sizes for the large or small boat owner.

Marine Glue

Nupro Marine Glue is made especially for laying seams in decks of large and small boats. Comes in two colors—red and black. Adhesive and elastic enough to withstand expansion and vibration.

GET OUR PRICES NOW

NEW PROCESS CHEMICAL CO., Inc.
41 Cortland Street New York City

Back to the Old Haunts

AMERICA will spend this summer out of doors. The strain of war over and the boys home again lake and river will echo once more with happy voices and carefree laughter.

You'll Need a KOBAN

For a summer of real outdoor delights, a Koban is indispensable. Attached to any rowboat it takes you where you will and when you will, with no back-breaking rowing to mar the pleasure of your trip.

The Great 2-CYLINDER KOBAN ROWBOAT MOTOR

The Fastest Rowboat Motor

Does Not Shake the Boat

Its two cylinders give it more power and greater speed. It will "run circles" around any other rowboat motor on the lake or river.

Both cylinders fire at the same time, neutralizing the shock. Only by this 2-cylinder opposed construction can you avoid the vibration that makes riding disagreeable, opens seams and ruins rowboats. *Special tilting device, for shallow water and beaching.*

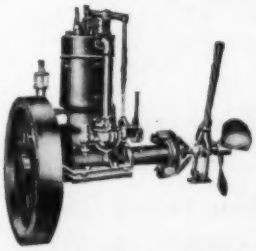
Write for catalog and full information. Dealers and local agents wanted.

KOBAN MANUFACTURING CO.
246 South Water Street, Milwaukee, Wis., U. S. A.

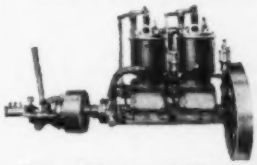
We also make an Inboard Engine for small boats and canoes. Circular 80 tells all about it.

STANDARD KID

Light Weight Four Cycle Engines



"Fish Skiff Special" 3¾" Bore, 4½" Stroke, 4 h.p.



Two Cylinder "Midget" 3¼" Bore, 3¾" Stroke, 7 h.p.

Five sizes—single cylinder 3½ h.p., 4 h.p., 7 h.p.; two cylinder 7 h.p., 8 h.p.

Lightest weight, dependable, reasonably priced, four cycle engine for small boats.

Hundreds in use on Pacific Coast, in Alaska and in the Orient.

Operate with equal efficiency on gasoline, distillate or kerosene—effecting real economy over other types small engines.

Best materials, best workmanship, standardized parts.

Suitable for dories, tenders, rowboats, sampans, fish skiffs, small trolling boats, small cruisers and auxiliary power for sail boats.

Catalogue showing improved models now ready for distribution. Send for your copy today.

Agents wanted everywhere.

CHANDLER-DUNLAP CO., M'f'rs.
Polson Bldg. SEATTLE, U. S. A.

27 Foot Cabin Cruiser

We build all sizes and types, but have made a specialty of this design.

CONSTRUCTION and workmanship is the best—equal in every respect to the high class of yacht work on which our reputation has been based for over 20 years. The lines are very fast, the launch is safe and able in severe conditions of wind and sea, and it has a large cockpit and very comfortable accommodations below decks. It is equally adapted to day service or cruising.

STEARNS & McKAY CO.
MARBLEHEAD, MASS., U. S. A.

GRAY-PRIOR
FOUR CYCLE MARINE MOTORS
Built up to a Standard—not down to a price

A Clean-Cut Power Plant

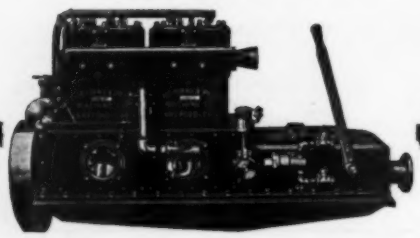
For Commercial Boats and Cruisers

Model D-4, Medium Heavy Duty

36 Horse Power **Bore, 4½ inches** **Stroke, 8 inches**

Write today for full description and prices

The Gray & Prior Machine Co.
56 Suffield St.
Hartford, Conn., U. S. A.



Miller Marine Motors

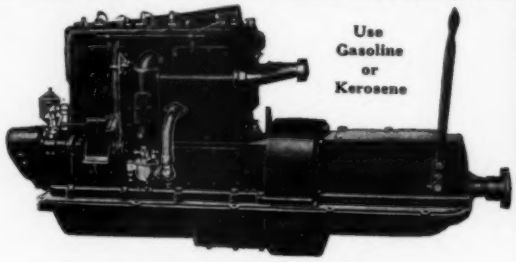
Every essential for good service—economy, power and dependability—is built into them.
There are fourteen Miller models, medium and heavy duty types, from 4 to 65 H.P. They are all four-cycle engines of approved design and will give the most economical service you can buy, considering first cost, fuel consumption and maintenance expense.

Write today for latest catalog and prices

Miller Engine Company

2329-2331 North Talman Ave. **Chicago, U. S. A.**

New York Distributors:
Consolidated Gas and Gasoline Engine Co.....202 Fulton St.
Agents for the North Pacific Coast:
Pacific Marine Engine Co.....78 Marion St., Seattle, Wash.
Agents for the South and Gulf Coast Points:
Menge Marine Hardware & Supply Co.....New Orleans, La.
Sole Agents for Australia:
A. J. Dadson & Co.....9 Hamilton St., Sydney, N. S. W.



The ONLY Life Saving Device that Has Made Good

An "Ever-Warm-Safety-Suit" will keep you afloat indefinitely. Buoyancy indestructible—not air inflated—*goes on in a flash.*

Fully Equip Your Boat with the
Ever-Warm Safety-Suit

Working or sailing, in wind and storm or, wrecked and overboard, everyone will always be protected from exposure—the cause of most deaths in mrine disasters. Pamphlet "23" explains—ask for copy.

NATIONAL LIFE PRESERVER CO.
11 BROADWAY, NEW YORK
Tel. Bowling Green 8609
Rental Plan for Ocean Voyagers

APPROVED AND USED BY THE U.S. NAVY DPT.

Advertising Index will be found on page 140

Knox

VALVE IN HEAD

MOTORS

A better motor for cruisers, work boats and runabouts. A source of unfailing power, regardless of severe demands or adverse conditions.

KNOX MOTORS ASSOCIATES
Springfield Mass

ACCESSIBILITY is a prominent feature of every Knox Motor. Adjustments are made easily because everything is within sight and easy reach. For instance, the screen that strains the oil is removed for cleaning simply by loosening three bolts and lifting it out by hand as illustrated.

This is one of those little things that contribute so much to complete and lasting engine satisfaction.

33 1/3

—that's what you save by the Brooks System of Boat Building

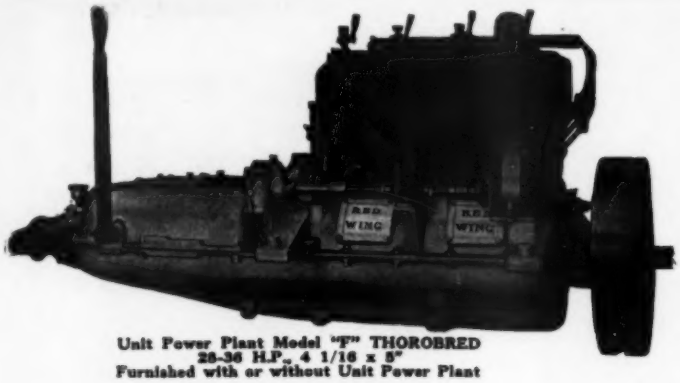
Think of saving $33.00 on every $100.00 you planned to spend for your boat. And to make this saving without sacrificing anything in quality, material or design. You can do this by taking advantage of the *Brooks System* of *Boat Building*—besides having the fun of putting your boat together.

Buy a Better Engine with the Saving

When you build by the *Brooks System* you can purchase a better engine by using your saving for this purpose. There is a lot more fun in boating if your boat is equipped with a powerful motor that shoots you through the water at exhilarating speeds. You can get the bigger power plant by using the *Brooks System* without increasing the amount of money you intend to spend.

The *Brooks System* is simplicity itself. You can't make a mistake—everything is marked so that the most awkward of workmen could not make an error in putting the boat together. *All Brooks boats are sold with a money back guarantee.*

BROOKS MFG. CO.
1000 RUST AVE. SANGINAW, MICH.



Unit Power Plant Model "F" THOROBRED
28-36 H.P., 4 1/16 x 5"
Furnished with or without Unit Power Plant

Red Wing Thorobred
THE MOTOR WITH POWER TO SPARE

"Gobs" of Pleasure

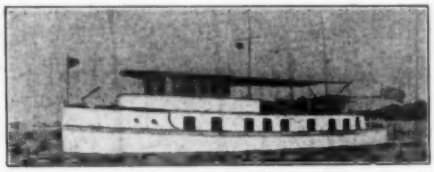
While Germany was still fighting several hundred thousand "Gobs" were learning to fight as well as to "sail". Now the fighting is over and they need not fight, but they are going to "Sail", every mother's son of them, and it is going to be in a snappy motor boat behind the kind of a marine motor that gets them somewhere without grief or very much cost.

Boat builders who can read the rainbow are making arrangements now for their supply of THOROBREDS for periodic delivery this Spring. **Are you?**

Better engines are not built, tho' higher prices are often paid. We build four sizes, 14 to 40 H. P. They burn either kerosene or gasoline. Write for details.

RED WING MOTOR COMPANY, Dept. B., Red Wing, Minn., U. S. A.

Mathis-Built Houseboats



70 ft. Houseboat Lanai
owned by Ex.-Com. A. J. James of the New York Yacht Club. Built by us in 1911.

Universally acknowledged as leaders in service, comfort and economy of operation. Selected because of their leadership by men who "know," like L. H. & A. W. Armour and James Deering of Chicago; like A. P. Ordway, Murray Guggenheim, H. N. Baruch, George W. Perkins, Arthur Curtiss James, W. J. Matheson, Henry W. Savage and other prominent New Yorkers.

Shall we submit the Mathis estimate on your architect's plans for that new cruiser?

Mathis Yacht Building Co.

Specialists in Houseboats and Cruisers from 40 to 120 feet.

COOPER'S POINT :: :: :: :: CAMDEN, N. J.

Advertising Index will be found on page 140

Boilers **TALBOT** Steam Power Plants

TRADE MARK REG. U.S. PAT. OFF.

ANNOUNCEMENT

The Talbot Engineering Corporation

HAVE OPENED

A Sales Office—Engineering Consulting Department at 66 Broadway, N. Y. City

FACTORIES IN U. S. AND CANADA MANUFACTURING

Talbot Boilers and Engines

Complete Marine Power Plants

Superheated Steam Specialties

WE CAN NOW TAKE NEW CONTRACTS WITH REASONABLE DELIVERIES

MAY WE SEND YOU BULLETIN B?

Talbot Engineering Corporation, 66 Broadway, New York City.

Motors for All Kinds of Boats

No matter what type of boat you have or are going to get, if it doesn't require over 30 H.P., we have a motor to meet your requirements exactly. Our line is complete. The CAILLE

Caille 5-Speed Motor

Liberty Drive ROWBOAT MOTOR

is the latest addition to the Caille line. The shaft extends straight out from the rear of the boat. The engine is in a vertical position. The drive is direct from engine to propellor. The entire motor pivots on stern of boat. Can be raised or lowered by pressure on steering handle. Steers by swinging propellor to right or left. Has speed of 5 to 10 miles an hour. Weighs about 70 pounds. Special catalog on request.

Liberty Drive Rowboat Motor

$58.00

All complete, ready to run, with battery ignition. Comes in two sections, for ease in carrying. Can be quickly connected together.

CAILLE 5 Speed Motor

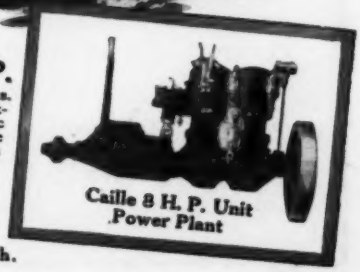
This is our well-known rowboat motor. Has five speeds—two forward, a neutral and two reverse. It is equipped with a starter—no cranking. Has magneto in flywheel. Thousands in use. Positively the most refined and highest-developed rowboat motor made. Ask for our 5-Speed Motor Catalog.

Caille Perfection Motors — 2 to 30 H. P.

Built in standard and heavy-duty types for pleasure and work boats. One to four-cylinder designs. Some have rear starters; some bulkhead control; some have electric starters and also furnish electric lights. When writing for inboard motor catalog, *always* state length, beam, draft, type and service required of boat. This will enable us to write you intelligently about the motor best suited to your needs.

Caille Perfection Motor Co.

44 Caille Bldg., Detroit, Mich.

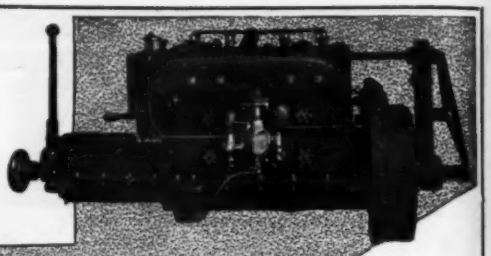


Caille 8 H. P. Unit Power Plant

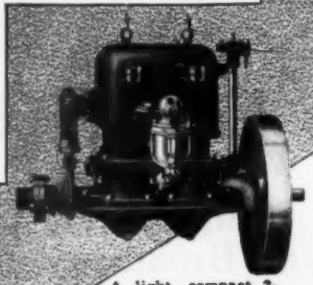
One of These Will Meet Your Needs

Somewhere in the line of Lockwood-Ash Marine Engines is one that will meet your needs.

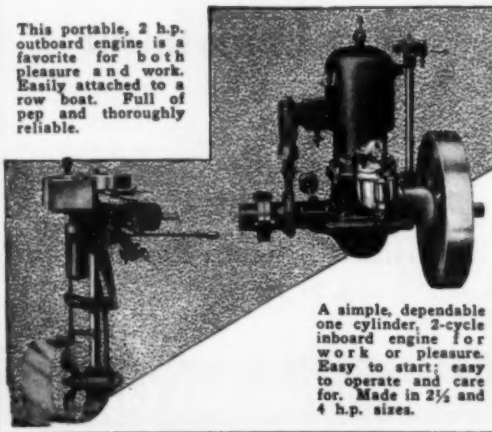
From the clean-cut, sturdy 2 h.p. outboard engine to the big four-cylinder power plant are varieties in size to cover a wide range of power and speed requirements.



Big brother of the Lockwood-Ash Engine family, a highly developed 4-cylinder, 4-cycle marine power plant. Rugged and dependable. Delivers up to 20 h.p. Built with or without rear starter.



A light, compact 2-cylinder, 2-cycle all-purpose engine, of few parts and readily accessible. Made in three sizes, 6-, 8-, and 12-h.p. The largest size should deliver up to 15 miles per hour.



This portable, 2 h.p. outboard engine is a favorite for both pleasure and work. Easily attached to a row boat. Full of pep and thoroughly reliable.

A simple, dependable one cylinder, 2-cycle inboard engine for work or pleasure. Easy to start; easy to operate and care for. Made in 2½ and 4 h.p. sizes.

Why Lockwood-Ash Engines Are Worthy of Your Choice

Lockwood-Ash Marine Engines are products of an institution which always has placed quality first. Experience has pointed out the sizes that make up the well-selected line and the quality standard has dictated the thorough workmanship which is in every Lockwood-Ash Engine.

Ask for the booklet that tells all about Lockwood-Ash Engines. Also ask about the 30-day trial plan.

LOCKWOOD-ASH MOTOR CO., Jackson, Mich.

LOCKWOOD-ASH MARINE ENGINES

(54)

LUMA RADIUM Radium Luminous Compound

Highest Quality

Because of its superior luminosity, long life and absolute uniformity Luma is the ideal material for illuminating the dials of marine and other indicating instruments.

Contains only Radium as its activating agent, no Mesothorium, Radiothorium, Ionium nor Polonium being added. Made in several grades or degrees of luminosity.

Write for booklet and full information.

RADIUM CHEMICAL CO.

GENERAL OFFICES – PITTSBURGH, PA.

LITTLE BLDG., BOSTON – MARSHALL FIELD ANNEX BLDG., CHICAGO – 501 FIFTH AVE., NEW YORK
MESSRS. WATSON & SONS, (ELECTRO-MEDICAL) LTD., 83 PARKER STREET, KINGSWAY, LONDON, W.C.2, ENGLAND

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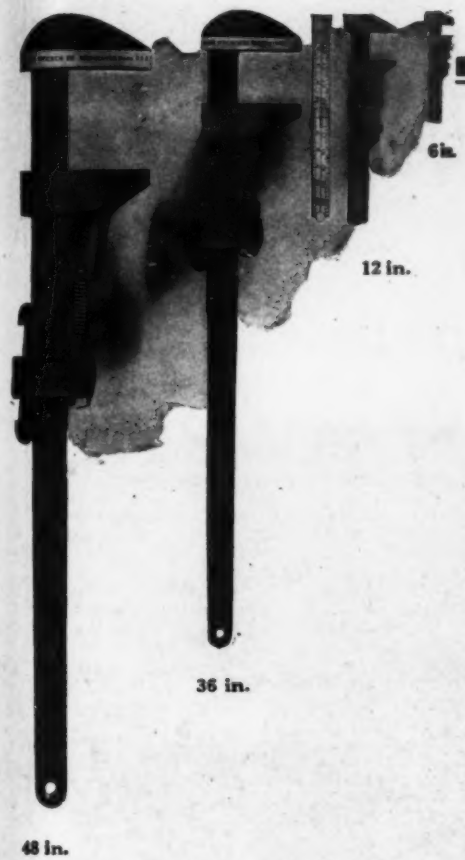


Coes Wrenches Are Good Wrenches—

That is more than an advertising statement. We manufacture a complete line of reliable wrenches to meet the insistent demand for tools of exceptional quality. We believe that the service given by a good wrench more than offsets the difference in price between the excellent and inferior. Boatmen especially should realize this fact—the need for really good tools is never more apparent than when a breakdown occurs miles from shore.

These all steel models of *Coes Wrenches* have no wooden handle to swell by contact with water and are as near waterproof as can be made.

A Wrench for Every Need

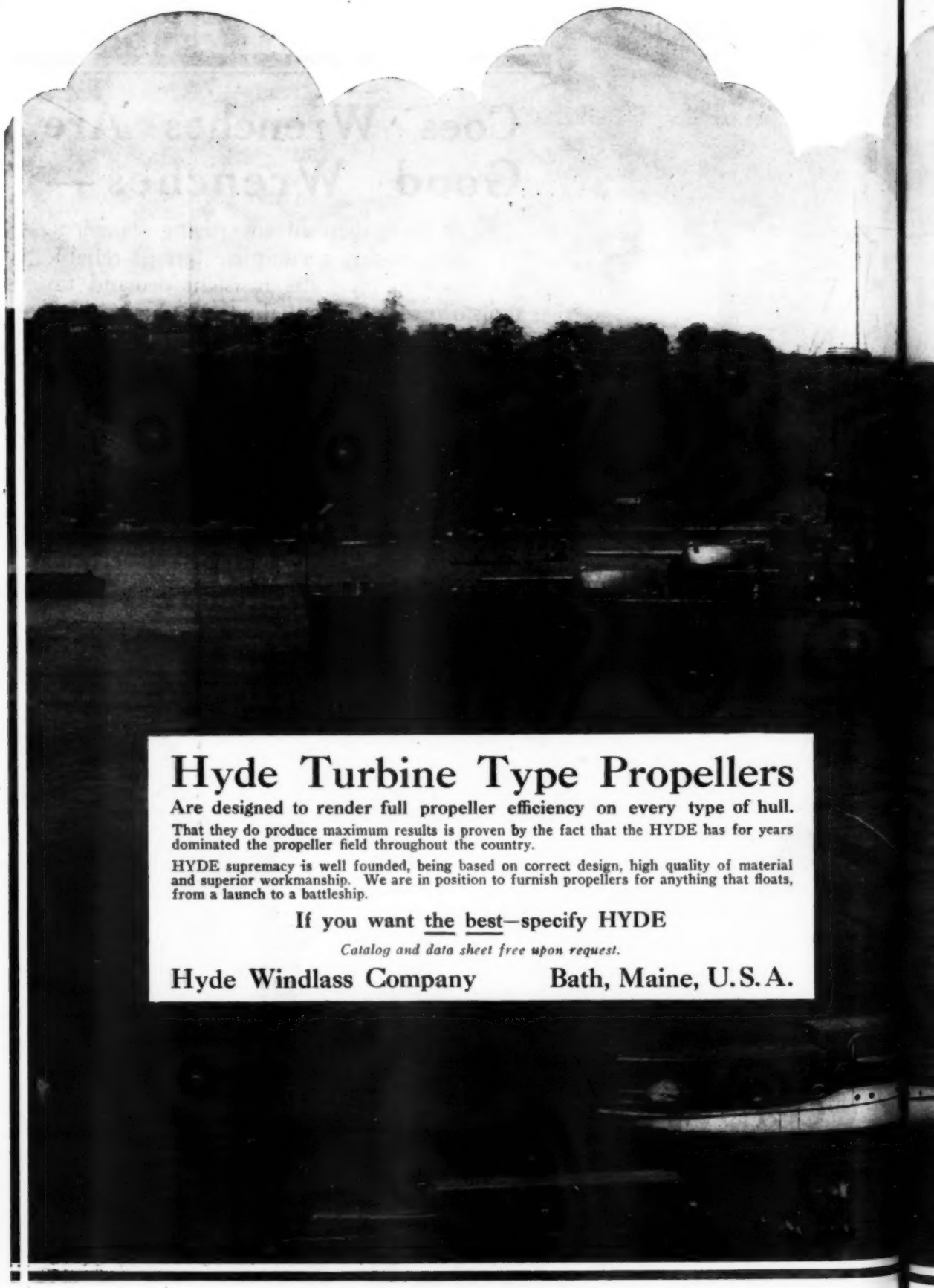
Coes Wrenches are made in a wide variety of sizes and styles. Our line of *Screw Wrenches* run from 6" to 48" long—there is a size suitable for any requirement in manufacturing or repairing. Many of our smaller sizes are in wide demand among motor boating enthusiasts who make their own repairs and adjustments.

We will be very glad to mail you the Coes Catalog. *Send for it to-day.*

48" Key Model Wrench Weight 62 lbs. Opens 9¼ inches

COES WRENCH CO.

Worcester **Mass.**



Hyde Turbine Type Propellers

Are designed to render full propeller efficiency on every type of hull.

That they do produce maximum results is proven by the fact that the HYDE has for years dominated the propeller field throughout the country.

HYDE supremacy is well founded, being based on correct design, high quality of material and superior workmanship. We are in position to furnish propellers for anything that floats, from a launch to a battleship.

If you want the best—specify HYDE

Catalog and data sheet free upon request.

Hyde Windlass Company Bath, Maine, U.S.A.

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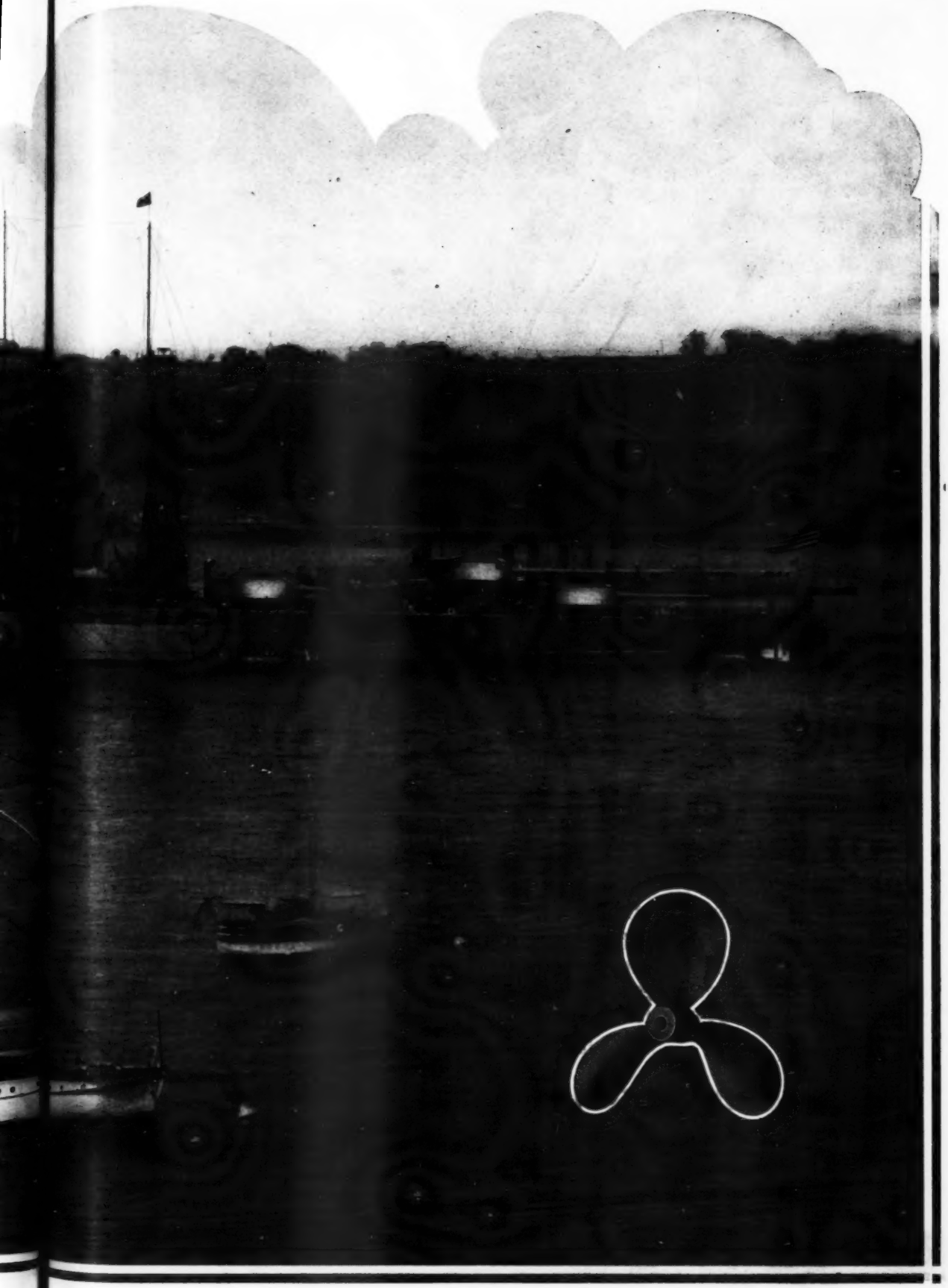
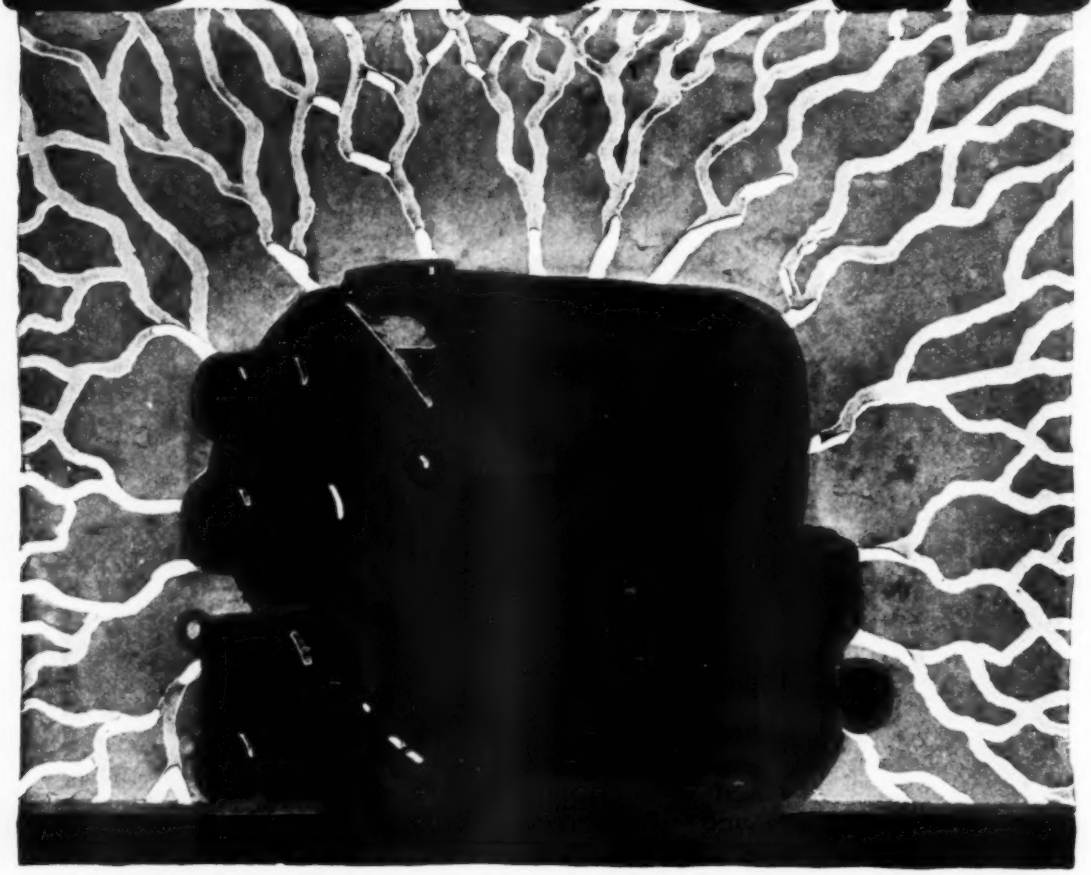


BOSCH



FROM the viewpoint of performance Bosch Ignition is beyond competition. The Bosch Service Record which begins with the building of the first internal combustion engines is unparalleled in the ignition field.

Whatever type of motor boat you buy there is only one type of ignition that means an absolute unfailing, self-contained source of rip roaring sparks which get every atom of pep and power out of every drop of gasoline—Bosch Ignition.

Write for descriptive catalog.

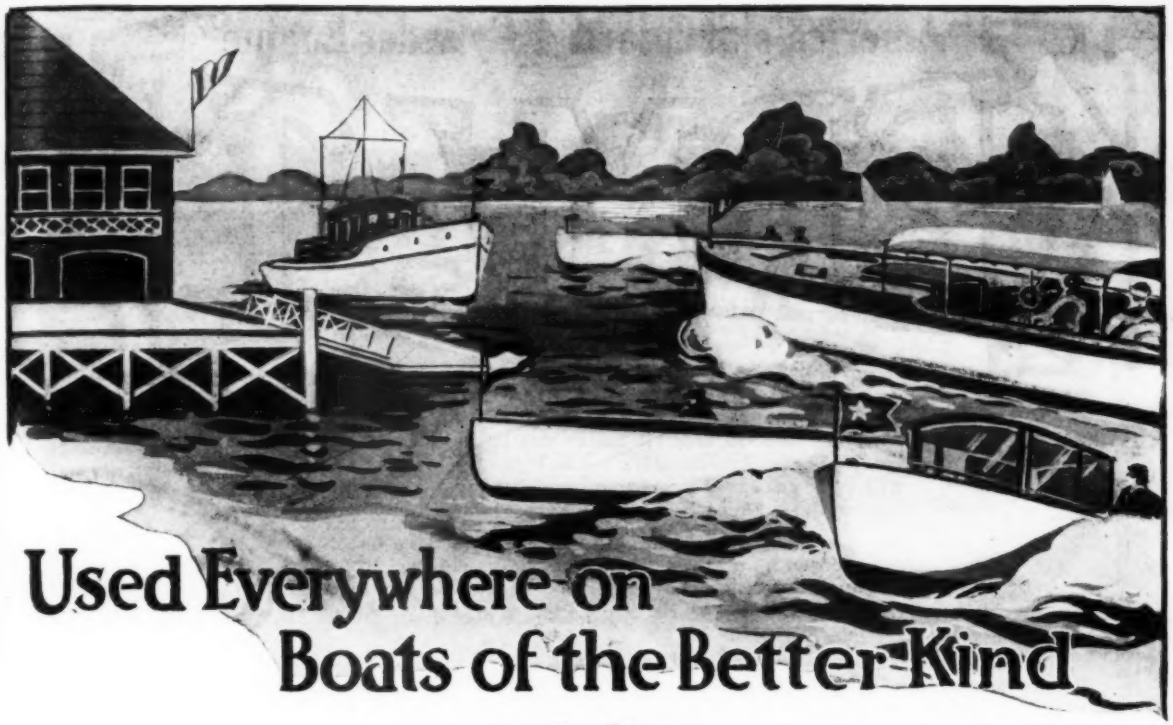
American Bosch Magneto Corporation

Main Office and Works—SPRINGFIELD, MASS. Branches—NEW YORK, CHICAGO, DETROIT, SAN FRANCISCO. Service Stations in 200 Cities.

AMERICA'S SUPREME IGNITION SYSTEM

MOTOR TRUCKS—TRACTORS—AIRPLANES—MOTOR CARS—MOTOR BOATS—MOTORCYCLES GAS ENGINES—Etc.

Advertising Index will be found on page 140



Used Everywhere on Boats of the Better Kind

K-A-U-R-I

Water TRADE MARK Proof

Spar Varnish

One of the most important qualities in varnish for marine use is its ability to withstand the action of the salt air and water. Varnish that turns white when exposed to these elements mars the appearance of any boat no matter how good looking every other feature may be.

K-A-U-R-I is absolutely guaranteed not to scratch white or bloom, nor turn white in salt or fresh water. Climatic conditions will not affect the brilliancy of its lustre or finish.

At the races, at the boat club, in fact any place where a large number of boats are found you will be impressed with the significance of K-A-U-R-I quality when you find most of the finer boats finished with this varnish.

Critical boatmen—those who realize the necessity for quality in varnish—are never satisfied with anything but K-A-U-R-I.

The fact that K-A-U-R-I is used extensively by the United States Navy Department at their various yards and on board battleships is a definite assurance that it will stand the less rigid tests of the private boatman.

Brooklyn Varnish Mfg. Co.
BROOKLYN, N. Y.

"America's Standard 4-Cylinder Engine"

KERMATH

Boating's Biggest Year

The year of 1919 unquestionably will be the biggest and most enjoyable ever known to the greatest pastime of all. The boys will all be back, the yacht and boat clubs will be in full swing —everything indicates a fine time this summer.

But you can't get all the enjoyment possible if your boat is powered with an unreliable power plant. No one wants to be last in the race or compelled to drop out because of engine trouble. *Now is the time to power your boat with an ever-reliable Kermath.*

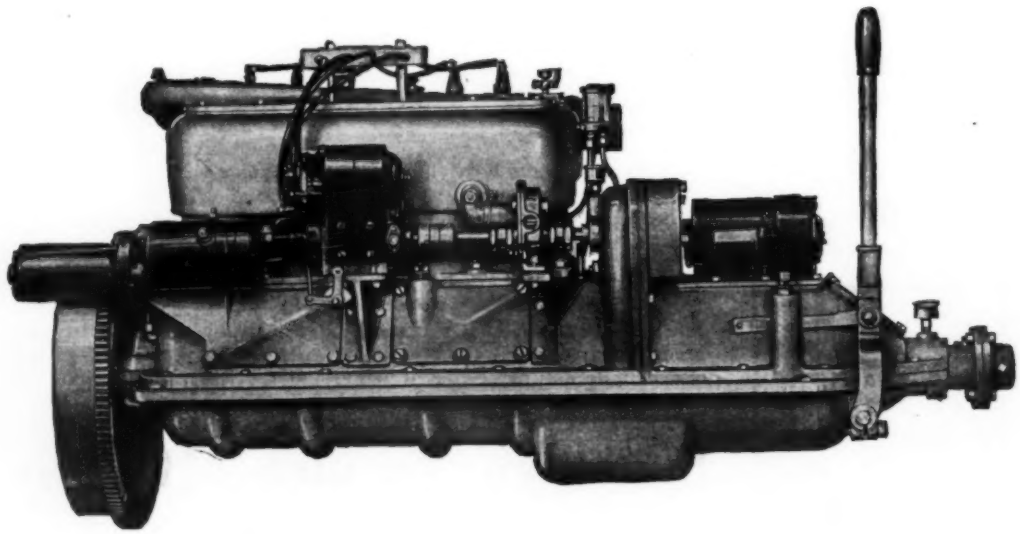
Kermath reliability has been proved so many times it is little wonder that it is the accepted power plant of many boatmen. Years of service under all sorts of conditions have resulted in a reputation that we are justly proud of. No requirements are too rigid for the Kermath. It is built for any service demanded of it—we have yet to hear of an instance where it failed.

Kermath engines are built in sizes suitable for either pleasure or work boats. There is that simplicity of construction that renders the motor proof against carelessness or wilful neglect. Every detail is planned so that trouble will not present itself after the boat is in the water—the time to guard against trouble is while the engine is being made.

There is a big Kermath Book that tells you about many engines and Kermath engines in particular. It suggests some reasons for Kermath supremacy that will interest you. Send for a copy to-day.

KERMATH MFG. CO.

DETROIT **Dept. 2** **MICHIGAN**



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"America's Standard 4-Cylinder Engine"

KERMATH

Commercial Boats

The development and perfection of the marine engine has resulted in a universal revival of the oldest method of transportation known to mankind—shipping by water. The work boat is rapidly coming into its own and has proved invaluable as a means of supplementing the work of the railroads.

Commercial boats require an engine that will measure up to a number of standards that are inflexible if utmost efficiency is to prevail. *Strength* and *endurance* are two factors that must dominate the heavy duty power plant. It is the lack of these two qualities that many commercial boat engines fail in their duties.

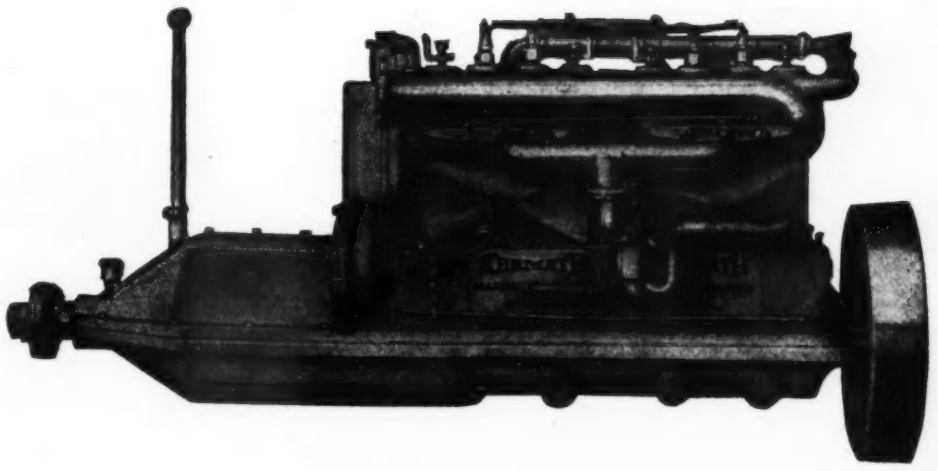
The Kermath reputation in the commercial field is just as prominent as in the realm of pleasure boats. It is built up to standards that insures its user complete and lasting engine satisfaction. No matter how exacting your particular requirements may be the Kermath will perform for you as it has for thousands of others. Kermath Engines prove in action every claim we make for them.

In selecting an engine for the work boat it is well to remember that it seldom receives the care and attention that is given the power plant in the pleasure craft. So simplicity should be sought as a means of eliminating trouble of any kind. The Kermath is a striking example of solid worth combined with extreme simplicity. Even the inexperienced find it easy to master and operate.

If your problem is a somewhat difficult one write us about it. We have many years' experience behind us and we will be very glad indeed to give you the benefit of the knowledge of our engineers.

KERMATH MFG. CO.

DETROIT **Dept. 2** **MICH.**



ATWATER KENT
SCIENTIFIC IGNITION

On Your Motor Boat

Atwater Kent Ignition on your motor boat is synonymous with reliability—a big hot spark at all speeds assuring easy starting in all weathers, gasoline economy and maximum power.

You can replace your magneto with Atwater Kent Ignition easily and simply.

Our Type H System will operate efficiently on marine motors, either from dry batteries (a season's operation from a set of six) a separate storage battery or a storage battery generator charged. Furnished for 1-, 2-, 3-, 4-, 6- and 8-cylinder motors.

Type H, on Magneto Base
Particularly adapted to marine motor use

ATWATER KENT MFG. WORKS
Philadelphia

Write for information to East Logan Street

Advertising Index will be found on page 140

Back to Shore for Supplies

When you're in a hurry and a choppy sea makes rowing hard, an Evinrude on your dinghy or other small boat will get you there and back in short order.

Carry an Evinrude and you can change a rowboat to a power boat almost as quickly as you can lower it.

EVINRUDE

Detachable Motor for Watercraft

furnishes dependable and unusual power. It is the standard outboard motor, with built-in flywheel type magneto, automatic reverse and other refinements.

A wonderful motor for fishing, clamming, "running around" and side trips where the large boat can't go.

Hundreds of power boat and yacht owners use the Evinrude. Nearly 100,000 Evinrudes have been sold—this motor is used by 25 governments.

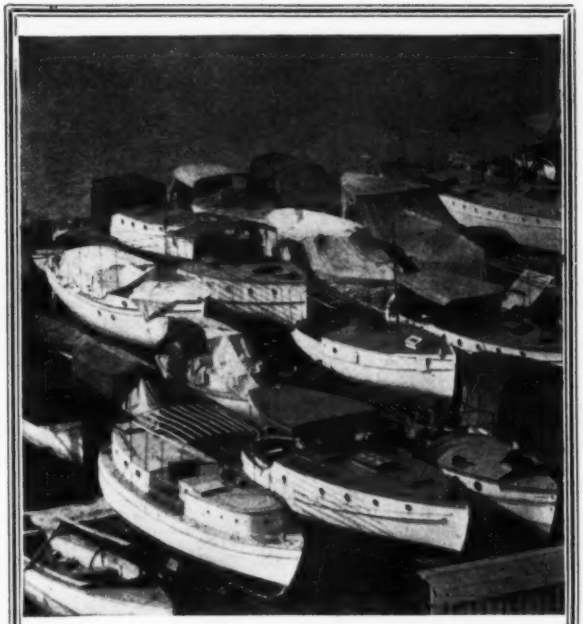
Catalog on request.

EVINRUDE MOTOR COMPANY

69 Evinrude Bldg., Milwaukee

Distributors:

69 Cortlandt St., New York, N. Y.
214 State St., Boston, Mass.
436 Market St., San Francisco, Cal.
211 Morrison St., Portland, Ore.



Canvas Facts For Boatmen

The Canvas used by motor boat owners for engine covers, spray hoods, deck covers, dinghy covers, etc., represents a considerable investment.

To get the greatest dividends from this investment the canvas so used must provide real protection and possess maximum wearing qualities.

To insure service of this kind it is only necessary to insist upon canvas treated with PRESERVO. For nearly twenty years PRESERVO has demonstrated its waterproofing qualities to the vessel owner of America. And those who once use PRESERVO soon realize the big saving they make through the additional service that they receive.

Because PRESERVO keeps the canvas soft and pliable—makes it proof against mildew and decay, and doubles its wearing qualities.

PRESERVO is good for both new and old canvas. It is inexpensive, easily applied and obtainable through almost any ship chandler or canvas goods dealer.

For special literature, address our nearest office.

ROBESON PRESERVO COMPANY

406 White Block, Port Huron, Michigan

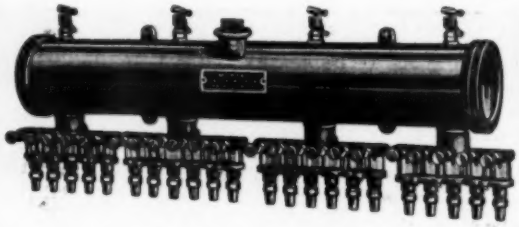
Eastern Branch:
357 Western Ave., Boston, Mass.

Canadian Branch:
Sarnia, Ont.

The Hunter-Johnson Company, 311 California St., San Francisco, Calif.
Distributors for the Pacific Coast

Preservo
Trade Mark Registered

Waterproofs and Preserves Canvas



MICHIGAN MOTOR FITTINGS

"The Guaranteed Kind"

We manufacture a full line of brass motor fittings, a few of which are illustrated in this advertisement.

Our catalog gives full details.

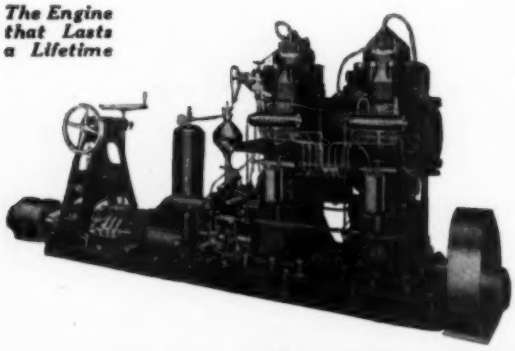
Michigan Lubricator Co.
Beaubien, Brady and Rowena Sts.
Detroit, Michigan, U. S. A.

Ma 39

GULOWSEN "GREI" OIL ENGINE

Power Plant Perfection for the Work Boat

The Engine that Lasts a Lifetime



The Gulowsen "Grei" Engine is the oldest crude oil engine on the market today, having been built for the last sixteen years. Under normal conditions it consumes ½ pint of crude oil or less per H. P. per hour.

No carburetor or valves. Centrifugal governor acts directly on fuel pumps. Ignition is by cast iron hot bulbs in each cylinder. The engine can be started from stone cold within 30 seconds by means of our new improved electric hot plug. This hot plug will last a lifetime, but can be replaced as easily as a spark plug.

The Gulowsen "Grei" is remarkable because of its unusual flexibility—something rarely found in a heavy duty plant. In equipping your work boat with this motor you will overcome all heavy duty problems.

4 to 100 B. H. P. ready for immediate delivery from Seattle or New York. Reasonable deliveries on larger sizes up to 360 B. H. P. Engines of 130 H. P. up are started and reversed by compressed air.

Write today for catalog.

M. H. Tracy Co., Inc. 17 State St., New York.

Advertising Index will be found on page 140

The husky horse and the well made harness!

PUT good money into a fine draft horse and hitch him up with a doubtful harness? Hardly. It's neither safe nor economical.

By the same token, harness your motor up with a gear that's equal to it. Anything less is a loss. Joes Reverse Gears are equal to any motor built—pleasure, work, or speed. They transmit the fullest horsepower and keep it under perfect control. You can reverse from full speed ahead to practically full speed astern instantly—and constantly if necessary. Action, positive, smooth, infallible.

You can usually have any gear on your motor you specify. For pleasure, profit and peace of mind this season and ever after, specify Joes.

Catalog describes Joes Gears for all boats; also Joes One-Way Clutches for high speed motors, and Joes Safety Rear Starter. Free; send for it.

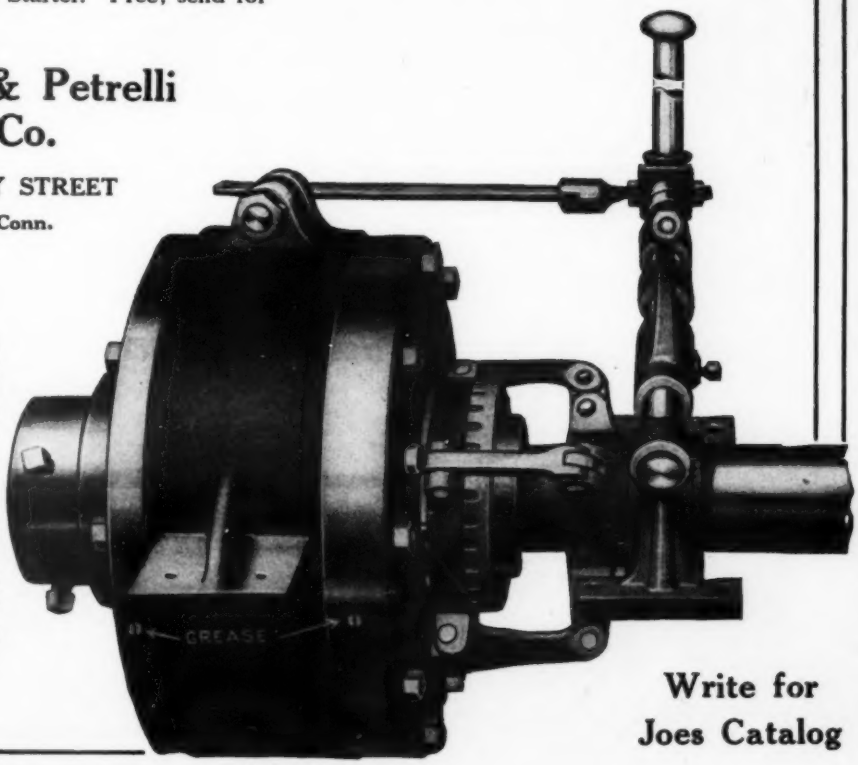
JOES REVERSE GEAR

The Snow & Petrelli Mfg. Co.

156B BREWERY STREET

New Haven, Conn.

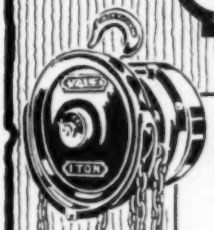
Agents: J. King & Co., 10 Church Row, Limehouse, E. London, England; L. H. Coolidge Co., Seattle, Wash.; W. E. Gochenaur, 631 Arch St., Philadelphia, Pa.; A. R. Williams Machinery Co., Toronto; Sutter Bros., 30-50 Church St., New York City; Service Station, Foot of 92d St., Brooklyn, New York; Marine Equipment Co., Los Angeles Harbor, Wilmington P. O., Cal.; A. G. Hegben, 436 Market St., San Francisco, Cal.; Arendahl Motor and Machine Co., Arendahl, Norway.



Write for Joes Catalog

JOES Reverse GEAR

YALE



Hoists of Steel

Fifty years' experience has taught us how to build Yale Spur-Geared Chain Hoists

THE skill of the designing engineer; the research of the metallurgical engineer; the use of one steel for wearing parts; the use of another for load tension and shocks; the choice of a steel for torsional strains; the adaptation of heat treatments; the exceptional workmanship; the exacting inspections and rigid tests *all* result in the Yale Hoist.

'From-Hook-to-Hook-a-Line-of-Steel'

For sale by Machinery Supply Houses. Catalog 18D. tells all. Do you want a copy?

For a Factory Locking Equipment use a Yale Master-key System.

Write for Particulars

The Yale & Towne Mfg. Co.
9 East 40th Street New York City

The Great Appeal of Motor Boating

(*Continued from page* 13)

is my idea of the best boat for giving me a good time. It is 22 feet long, with a beam of 40 inches and powered with a 6 h.p. two-cylinder motor. I can easily get 12 miles an hour, and as the craft is decked on the sides as well as fore and aft, I have found it a good sea boat. I have cruised along the shore and made long trips up the river. My canoe is roomy enough to carry all the camping duffle and provisions I need on a trip by stretching a tarpaulin over the cockpit and turning in on top my pneumatic mattress I have a comfortable sleeping place. This craft measures up to my needs so well that sailing will never satisfy me again. Sailing is a good sport, but motor boating is a better one. My motor runs like a watch. The reason why Cap. found me adrift was because the boy in my shop forgot to obey orders and fill my gasoline tank and I failed to check him up on the fuel question when I started out."

"And now it's your turn, Cap.," I reminded him. "Turn to and speak your little piece, that all of us amateurs at the game may hear."

"Ye all know me for a booster o' the ingine, an' as all of ye owns natty boats ye don't need me arguments." And Capt. Jerry fished out the old yellow bag of Mayo's tobacco and after filling his pipe started on a favorite course.

"Next to a good wife, me lads, there ain't nothin' better fer a man what likes healthy sport than a good boat. There be boats an' boats an' ye kin put sticks in 'em and sail 'em or ye kin 'stall a good ingine and be indypendent o' the wind and tides. I ain't goin' back on the kites, mates, fer they has served me well and bring me ship into the old T-wharf at Bootin' many times whin the devil was a-pullin' at me coat tails. Yer see, the old feller wanted me, but me little ship had a spankin' wind and leaves him hull down in no time. 'Tain't me way to pocket ole frin's, but me ingine is wurth a lot of argyment. Whin I furst takes charge o' the post light on the breakwater yonder I buys Mary Ann. The feller what's owns her afore me rigged her up as a racer, but I cuts off her main boom and gaff and bends on stronger sails to stan' the hard knocks of me fishing' bizness. But ye got to have wind to sail, an' after rowin' an' driftin' for two years I took a look at ingines. Bein' a sailin' man I keeps me kites fer another year after the ingine wus put in, whin I sees no use to keep on pushin' all that top hamper agin the wind, so I takes down me mast and spars and chugs erlong ever since with me ingine.

"Boatin' with an ingine is a sport for all what likes the water. It alwus has bin me bizness an' me pleasure and I ain't tired of it to speak of yit. Motor boatin' is an universool sport no one's too old to enjoy, no feller too rich to have hilthy fund on board his own little ship. Ye kin buy a big boat or a little one, or pick yer craft betwix' and between, an' if ye gits a natty craft with easy lines and a good ingine ye will larn better'n man kin tell ye that th' fellers what follers the water fer wreckreashun git the sport that can't be beat. So I, bein' an old han' at the sea, I alwus sarves me honest advise and says to 'em what asks for my 'pinion, that if ye wants a sport with pep and tang, buy a boat with an ingine, me lad."

In Launching Terrain to Be Considered

(*Continued from page* 29)

old spar, or by three or four pieces of old exhaust pipe if nothing else is available.

With the cradle constructed, move the boat carefully down off the blocking and slide the cradle under. Chock her up on the middle cross piece and see that everything is good and solid. It is a good plan to lash the boat on the cradle also. If the ground is soft or rough it will be necessary to use some old planking or boards to roll the cradle along on.

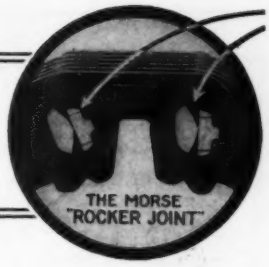
Now with a block and tackle, a good stout stick of timber for a pry and a crowbar, a small sized crew can make good headway.

After the boat is launched the cradle should be removed immediately, so there will be no danger of stoving a hole in the boat.

E. W. N., Boston, Mass.

Advertising Index will be found on page 140

Morse Silent Chain Drives *for* High Class Marine Motors



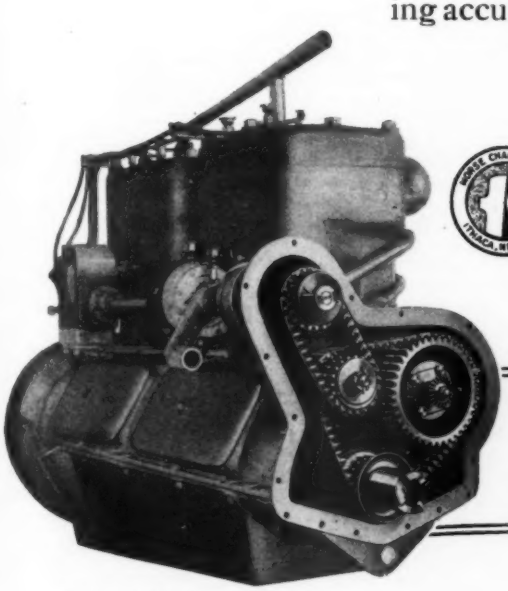
A Silent Chain Because—

it results in smoother operation, quieter operation and more efficient operation. The silent chain, when used for driving the camshaft and accessories, results in the elimination of the troubles incident to motor gear drives. The silent chain drive has been adopted by most automobile manufacturers because of the very features that make it so necessary on marine power plants.

The Morse Silent Chain Because

its superiority is based on the design of the exclusive "rocker-joint" construction, the unique heat treatment and the quality of materials employed in its making. Morse Silent Chains appeal to the manufacturer of marine motors because they stand up under the severe service demanded of an engine on board boat. The camshaft, the water pump and the magneto must function with uniform flexibility in the marine engine and the Morse Silent Chain accomplishes this result with unerring accuracy.

**We will be glad to tell you our story—
its an interesting one.**



Scripps 4 Cyl. Marine Motor

Morse Chain Company

General Offices and Works

ITHACA - NEW YORK

Detroit Office and Display Room:
1003 Woodward Avenue

Adapted by the Leading Automobile Manufacturers

Aerothrust

The Power Plant that Opens Up Every Body of Water to You

Discard your old propeller and install an ever-reliable Aerothrust Power Plant in your boat. It's just the thing for fishing because you can go anywhere you care to regardless of weeds or lack of water. With the Aerothrust you get *more speed* when driving against the wind because the wind increases the propeller thrust.

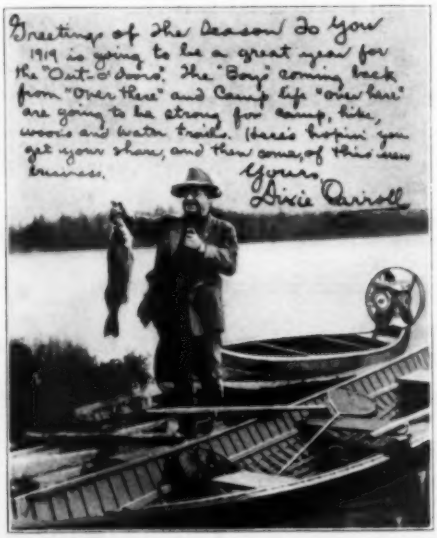
The Aerothrust is easily attached to your boat in less time than it takes to attach an ordinary electric fan to a wall. It removes you from the trouble of under water propulsion and gives you more latitude in the selection of places you want to reach.

No Water Too Shallow

The Aerothrust is a life saver to those who desire to cruise around in shallow waters. Weeds do not affect it because the driving power is in the air—similar in every way to the motive power used in aeroplanes. When you are fishing you can glide over the water with an Aerothrust without disturbing the elusive fish.

Write for Booklet
What owners will tell you about Aerothrust Service

AEROTHRUST ENGINE COMPANY
La Porte **Ind.**


Greetings of the Season to You
1919 is going to be a great year for the "Out-o'-doors". The "Boys" coming back from "Over there" and Camp life "over here" are going to be strong for camp, hike, woods and water trails. Here's hopin' you get your share, and then some, of this new business.
Yours
Dixie Carroll

Two Men, a Maid, and a Boat

(*Continued from page 22*)

it was being carried on I was forced to fight with the gasoline cans and water jugs for standing room on the 2-foot after deck.

But to continue—when the bedding was set away, the side-curtains rolled up, the anchor lights disposed of, the various boxes, kegs, and life preservers set back in their day-time positions, we were ready to start the motor, haul the anchor and away.

Being novices, it took us an hour to finish the work this first morning, but at 5 o'clock we were under way, just as the sun yawned above the horizon. Straight out into its golden path we raced, the water cutting away from the sides of our boat in bright yellow masses, coming to rest farther away in undulating waves of green and purple.

We took our course by Owl's Head Lighthouse, which, after the fashion of its namesake, perches high and white on a granite bluff and marks the entrance to Owl's Head Bay. As we passed through the Bay I got the breakfast on a tiny, one-burner alcohol stove. It held only one pot at a time, and exceedingly difficult was it to keep the coffee warm while I cooked the bacon and eggs. But such food! Did anything ever taste so good? I would be ashamed to tell you how we scraped our plates. One flip into the salt water as we sped along and they were as good as ever.

At White Head Lighthouse we left Mussel-Ridge Channel, bade farewell to sheltered water, and made for the open sea, taking our course to Pemaquid Point. It was my first experience steering by compass, and under my unsteady eye and hand the needle often marked a complete semi-circle. Beyond White Head Light we encountered a heavy ground-swell, waves about 20 feet high with 300 feet between their crests. We climbed their heights and slid down their slopes but a very few minutes before I felt ill, and although I went right on with my house cleaning, or rather boat cleaning, and did my share of the steering, I only recovered when we dropped anchor in Portland Harbor that afternoon.

After leaving Mussel-Ridge Channel there was nothing to see; the Maine coast became only a memory, except where we met it again jutting many miles out from the Mainland in rugged capes. As far as eye could reach rose and fell the quiet sea. Occasionally we came up with a spindle or bell buoy marking a shoal spot over which the waves broke, the white, seething foam tossing high into the air. Occasionally far out on the horizon a line of dark smoke proclaimed a passing steamer, or we saw the skeleton spars of a sailing-vessel.

The dangerous, rock-filled passage between Pond and Seguin Islands proved exceedingly rough. A cross wind and tide broke the ground-swell into a bad chop. Boojum pitched and tossed, making slow progress; turning back was impossible, so on we ploughed, expecting each moment that the boat would be overturned by the heavy waves, or dashed against the great boulders at the foot of Seguin Light. Twice I was thrown violently out of my chair, and giving up the attempt to remain seated, I took my place beside the helmsman, calculating the danger we were in from his white, drawn face, as he endeavored to keep the bow of the boat headed into the sea. Had our engine failed us! I shudder at the possibilities. But it didn't, and here we are to tell the tale.

After rounding the Junk O' Pork, we found the way smoother. We had been running several miles off shore most of the way, and here we began to turn in toward land. As we rounded Cushing Island Monhegan passed us. We had seen her first in Owl's Head Bay about 5 o'clock in the morning, and the crew recognizing us waved and cheered to us now. A few minutes later we found ourselves behind the Portland breakwater. Slowly we crept up to the City's wharves between the forts guarding the entrance to the harbor, and at 2 o'clock we cast anchor.

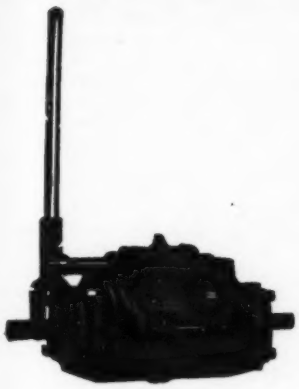
After a long process of cleaning both the boat and ourselves, we went ashore. Portland was holding Dollar Day. All the rubes were in town, and again my short hair attracted great attention.

Returning to Boojum, we prepared for bed, though not for rest, for the mosquitoes promised us a lively night. With twilight, however, they disappeared, and we were

(*Continued on page 98*)

Advertising Index will be found on page 140

THE JOHNSON MARINE REVERSE GEAR



Exterior.

The Johnson Marine Reverse Gear Makes Boating a Safe Pastime

Making a safe landing is one of the arts of boating and without a reverse gear there are few who can perform the feat without damaging bumps against the float. A reverse gear makes the act a simple one as it places entire control of movement in the hands of the man running the engine. Just as the reverse gear prevents bad landings so does it prevent accidents by collision. The danger of running into obstructions is practically eliminated if your motor is equipped with a reverse gear.

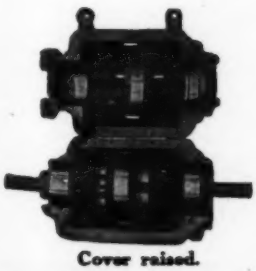
The *Johnson Reverse Gear* is the ideal equipment for your engine — there are several fundamental reasons for *Johnson Reverse Gear* supremacy.

The Only Reverse Gear With Ball Bearings

One of the outstanding features in the *Johnson* is the fact that all wearing parts run on ball bearings and this feature is exclusive with us. The *Johnson Friction Clutch* is the result of tests that have proved this method of construction to be superior. The quality of material and workmanship that goes into each *Johnson* is always uniform—nothing but the best will do.

Evinrude, Frisbie, Koban, Lockwood-Ash, and Sears Roebuck are only a few of the reliable manufacturers using Johnson equipment.

Write to-day to Department 25



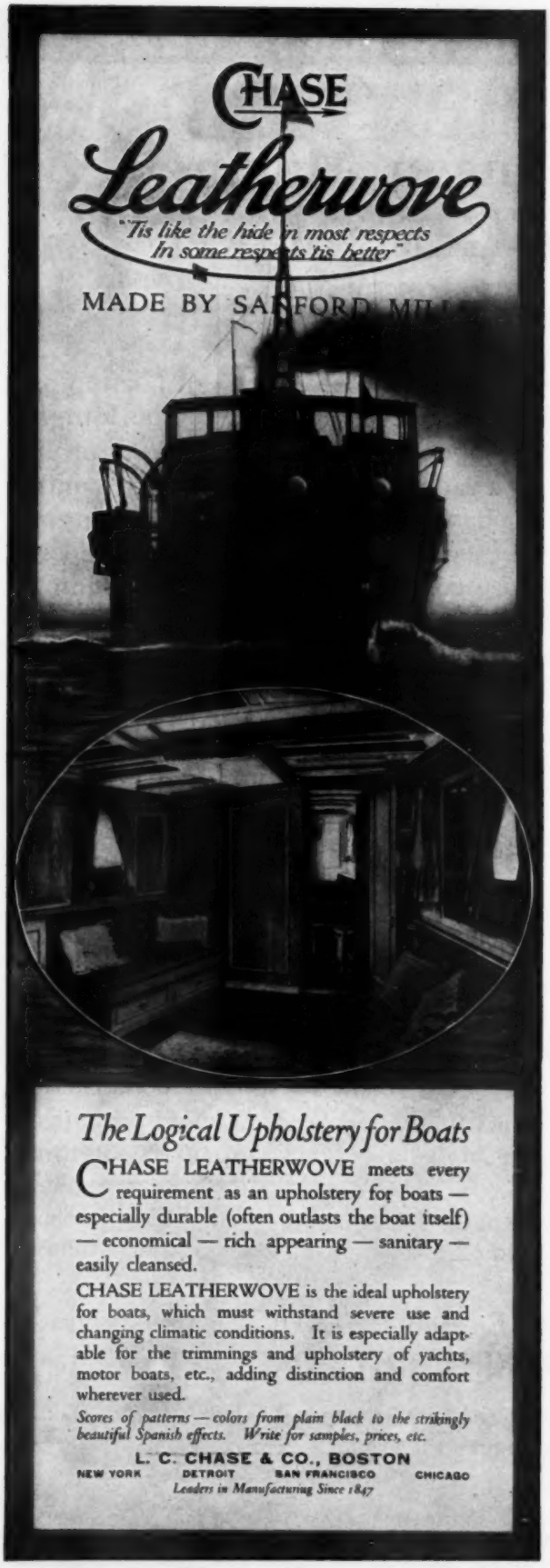
Cover raised.

Famous Marine Engine Builders Use the
JOHNSON MARINE REVERSE GEAR

Tell us the size of your boat and we will be very glad to suggest the proper reverse gear for it.

Interior.

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN.


CHASE
Leatherwove
"Tis like the hide in most respects
In some respects 'tis better"
MADE BY SANFORD MILL
The Logical Upholstery for Boats
CHASE LEATHERWOVE meets every requirement as an upholstery for boats — especially durable (often outlasts the boat itself) — economical — rich appearing — sanitary — easily cleansed.
CHASE LEATHERWOVE is the ideal upholstery for boats, which must withstand severe use and changing climatic conditions. It is especially adaptable for the trimmings and upholstery of yachts, motor boats, etc., adding distinction and comfort wherever used.
Scores of patterns — colors from plain black to the strikingly beautiful Spanish effects. Write for samples, prices, etc.
L. C. CHASE & CO., BOSTON
NEW YORK DETROIT SAN FRANCISCO CHICAGO
Leaders in Manufacturing Since 1847

Two Men, a Maid, and a Boat

(*Continued from page 96*)

crooned to sleep, under star-lit skies, by the gentle lap, lap, lap of the tiny ripples slapping against the side of the boat.

After the first few hours' rest, Bayard woke "every hour on the hour." About 4 o'clock he urged me to get up, but I stuck it out until 5, when I rose and began to prepare breakfast, while Bayard went through his blanket drill.

We filled up our thirty-gallon tank with gas and got under way about 7:30. A heavy mist was abroad as we started, but it lifted a little as we reached Portland Head. The sun was brilliant enough after that, but the haze persisted. At 8:30 we reached the twin lighthouses of Cape Elizabeth, where Bayard shut down the engine and gave his apprehension complex its morning exercise. Finding nothing wrong, we proceeded on our way. There was still considerable ground-swell, and again I found it disturbing.

This run from Portland to Massachusetts Bay is fairly risky for a small, unprotected boat, for there are long runs between harbors, and the low, sandy coast offers no protection. Heavy weather is not rare along this coast, and sudden fogs are frequent. If caught outside by the fog, there is nothing to do but stay out, for an attempt to make harbor would probably land you on one of the ledges that guard the coast. But the weather was fair, and we anticipated no trouble.

Below Portland we left the rugged coast that marks northeastern Maine and began to accustom our eyes to the low sand-dunes that characterize the Massachusetts and New Hampshire coasts. We were well off shore, the yellow sand cliffs making a line of gold along the distant horizon. I had grown more accustomed to steering by compass, and most of the course that day was taken in this way.

Near the mouth of the Merrimac River we passed a Portugese fishing smack. Something hung from her mast like herring from a string.

"Men on the lookout for schools of fish," said Bayard.

A short distance along we passed another group of fishing-boats hauling a seine.

Because of the heavy haze, we had difficulty in picking up the Ipswich Lighthouse, and did not sight it until we were almost upon it. Finally, we were able to discern both it and the Annisquam Lighthouse at the same time. At 5:15 we turned into the Squam River, which is not a river at all, but a narrow, muddy strait, and after running in what semed to be a complete circle for three-quarters of an hour, we pased under a low bridge and into Gloucester Harbor.

I had been looking forward with delight to the Gloucester of my dreams—a tiny coast hamlet crowded around a lighthouse, a beach all white sand and great booming breakers—ancient grizzled mariners, garbed in spotless yellow oilskins, long-bearded, and with the blue-green glint of the sea in their eyes. Alas for the stuff that dreams are made of! The Gloucester of fact is a large town, smelling heavily of fish—live fish, dead fish, salt fish, good fish, bad fish, fish oils, and fish glues. The wharves are lined with fish factories and warehouses, the houses of the town are invariably red and white, built in block-like sections, the broader blocks at the top. Close down to the water they crowd, these queer, hodge-podge habitations, peering out over the harbor with a half-inquisitive, half resentful look.

Twice we traversed the harbor looking for an anchorage free from smells and sheltered from the wind sweeping in from the open sea. Bayard was for clinging to the vile-smelling docks, but I struck for the main channel, and finally we anchored close to a great square boat which Bayard said was a pinky, and very old. There were quite a number of good-looking runabouts in the harbor, and the occupants seemed much interested in our dirty little craft. It was dusk when we threw over the anchor and began our preparations for supper. We were hungry, sulky, dirty, and disgusted with voyaging in a small boat, and weary, terribly weary from steering the thirteen hours it had taken us to come from Portland. To add to our misery, hordes of mosquitoes took possession of the boat, giving us the glad bite, welcoming us to dirty Gloucester.

Their constant biting and buuzzing kept us awake, and finally we got up and wrapped our heads in kerosene-soaked cloths. When next we came to, it was daylight.

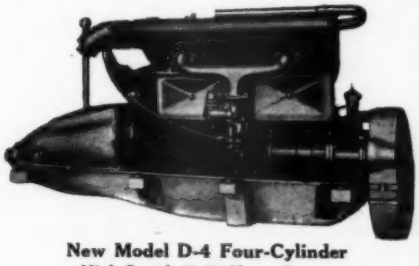
Advertising Index will be found on page 140

Scripps

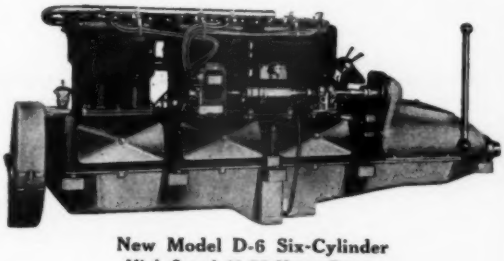
"The Motor That Crossed the Atlantic"

THE DEALER'S LINE

The boat builder and engine dealer want a motor to sell that has a real reputation, that offers a wide selection of powers, that satisfies public demand, that is priced at a fair figure and that when once sold stays sold without any comebacks. The Scripps is such an engine.



New Model D-4 Four-Cylinder
High Speed 40-50 Horse Power
Medium Duty 25-35 Horse Power



New Model D-6 Six-Cylinder
High Speed 60-75 Horse Power
Medium Duty 35-45 Horse Power

"Scripps Special"
15-20 Horse Power
A good simple, popular-priced engine for smaller boats

SCRIPPS design and construction haye always adhered strongly to the conservative and the practical in engine building. That the modern motor is a machine for performing work economically and with freedom from breakdown has never been lost sight of. Outside fads and frills in design have not been adopted for popularity nor have dependability and durability ever been sacrificed for the passing craze for extreme light weight or excessive high speed.

Yet the SCRIPPS motor is not unnecessarily heavy in construction. Through the selection of special materials and special alloy steels the weight is kept as low as absolute safety permits. SCRIPPS motors have won many noteworthy events in racing simply by reason of their tremendous power coupled with their unfailing dependability and certainty of service.

The factor of safety has made the SCRIPPS a paying investment in commercial service, where low cost of operation, low maintenance expense, long life and freedom from shut-down or break-down are prime essentials. Hundreds of SCRIPPS motors have been operating for years in ferry and cargo service (oftentimes on 15 to 20 hour daily schedule) with practically little or no outlay for repairs other than battery or spark plug replacement.

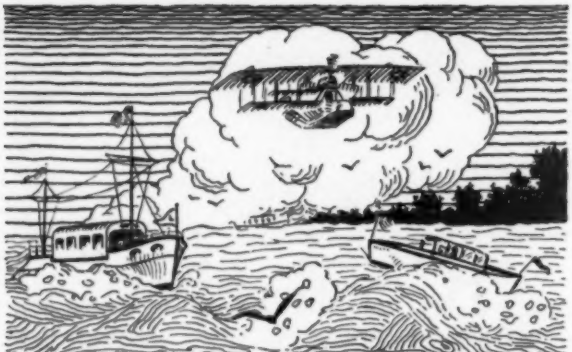
Scripps reputation among engine men and boatmen everywhere can be summed up in the brief statement that "they are absolutely dependable and certainly stand up."

It is significant that a very large percentage of SCRIPPS business is in the export field. Here built-in service is the first essential, for a motor operating thousands of miles from a base of supplies must be free from dependence on the factory for frequent service and replacement parts. SCRIPPS engines have lasting service built in before they leave the works.

The SCRIPPS line is unusually complete, including power plants for almost every marine purpose—speed, runabout, cruiser or commercial work—of various sizes and types from 10 to 75 H. P.—all four cycle engines, both medium duty and high speed—some using gasoline exclusively, others fitted for burning either gasoline or kerosene.

SCRIPPS MOTOR COMPANY
631 Lincoln Ave. Detroit, Michigan, U. S. A.

"Every Moving Part Enclosed"



LUNKENHEIMER
MOTOR
ACCESSORIES

on your motor is "insurance" against interruption or delay. They are positively proven, dependable and economical devices whose reliability in service has demonstrated their worth on all types of internal combustion engines.

Satisfied users everywhere acclaim the merits of Lunkenheimer products. Your motor should be **"Lunkenheimer - equipped."**

Leading dealers sell them. Specify **Lunkenheimer** and insist on having the genuine.

Our Motor Accessories Catalogue No. 4-CC illustrates the complete line. Shall we send you a copy?

THE LUNKENHEIMER CO.
"QUALITY"
Largest Manufacturers of High Grade Engineering Specialties in the World
CINCINNATI
Chicago Boston
New York 29-25-33 London

Engineering Up the Engine

(*Continued from page* 15)

shims from each side of the bearing. After it is removed tighten up on the nuts and the bearing will grip the shaft tighter, but do not permit it to bind but just a good snug fit. If the metal shims are too thick you might try substituting cardboard or paper shims.

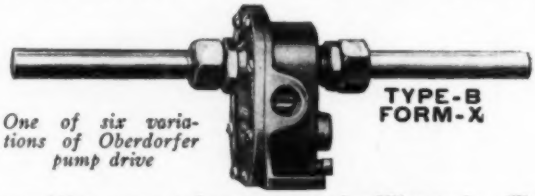
Exhaust valves of the four-cylinder motors have a habit of getting themselves all sooted up and this makes grinding in necessary. It is a comparatively simple operation to grind a valve but it is seldom done correctly. There is much difference of opinion as to whether emery should be used. Some will tell us that we should never use emery if we can procure a little bit of ground glass and that the dirt that accumulates in the trough of the grindstone is excellent for the purpose and cuts sufficiently fast, while others hold that if the valve and seat are in fairly good condition a very fine grade of emery and carborundum will prove quite satisfactory. There is one thing certain, however, and that is much labor may be saved by dressing off the bevel face of the valve with a flat, fine-cut file if the valves have been neglected and are deeply pocked, marked and hammered. For this work it seems to be mainly a matter of personal preference as various people use emery, carborundum, pumice or finely powdered ground glass.

Oberdorfer Bronze Geared Pumps

(*Continued from page* 70)

Bronze geared pumps suitable for many uses on motor boats with variations in diameter for adaptability in installation combined with an exceptionally complete line are factors that the M. L. Oberdorfer Brass Co., of Syracuse, N. Y., are featuring in its bid for new trade. These pumps are used mostly in connection with water and oil circulation on gas engines, but they are admirably adapted to a large variety of other purposes.

This line includes circulating pumps, oil pumps for big motors, fuel pumps for use on big engines, both gasoline and



One of six variations of Oberdorfer pump drive

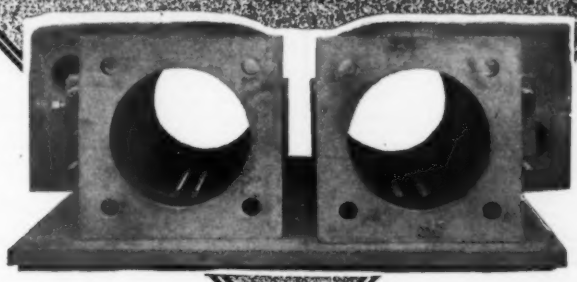
steam, bilge pumps and water pumps for filling tanks. They can be used wherever a comparatively small quantity of liquid is to be positively moved in a steady and reliable manner. Thousands are in use on gas and gasoline engines circulating water and oil. Every experienced marine navigator knows the importance of perfect cooling, positive fuel and lubricating supply to the life of his power equipment. It is a useless expenditure to invest in delicate and expensive machinery, only to have it ruined by overheating through lack of a proper cooling system.

The Oberdorfer bronze geared pumps have been on the market for over a quarter of a century, and in that time the engineers of the corporation have had a chance to study the exacting needs of marine engines and to make improvements to the original pumps as the development of marine engines progressed. The cooling and lubricating of internal combustion engines is most exacting and the Oberdorfer pump is designed to insure positive pressure, lifting power without priming, and liquid in exact proportion to engine speed.

In construction the pumps are simple and durable and consist of the smallest possible number of moving parts. The housing and gears are cast of bronze perfectly adapted for the purpose, Tobin bronze being used in all shafts in place of steel. Brass screws are used for securing cover plate to body so that there may be no rusting or corrosion. All parts are carefully machined to gauges and are perfectly interchangeable. Drive shafts are provided with stuffing nut, secured by lock nut. Every Oberdorfer bronzed geared pump is tested before placing in stock. None pass inspection unless they show at least 80 pounds pressure on discharge and must raise water three feet without priming.

Advertising Index will be found on page 140

LAWRENCE
PATENT PROCESS



Scored Cylinders Repaired Without Regrinding

There is no mystery connected with the *Lawrence Patent Process* for repairing scored cylinders without regrinding. Briefly the process is this:—Skilled mechanics electrically fuse a silver nickel alloy into the scores or defects and then *refinish them like new.* But the process is exclusive with us—it is patented and can be used by none but the Lawrence plants or authorized licensees.

We operate under the Lorenowicz patents which have saved thousands of dollars that would have been spent for new equipment. The *Lawrence Patent Process does not change the bore of the cylinder*—standard pistons fit perfectly—resulting in restored compression with greater power. Send your next job to us and learn about this new method.

Satisfaction Guaranteed

When you send your defective cylinders to us you assume no risk because we guarantee our work to last for the life of the motor. There are no "ifs" or "ands" in connection with this guarantee—if the work is not satisfactory in every way we will make good. If our work isn't done so well that an expert could not tell it from a new cylinder in operation we will make no charge for our services. That's fair enough, isn't it? The *Lawrence Patent Process* is particularly advantageous because it is *very inexpensive.*

That the Lawrence method is mechanically and scientifically correct is attested to by the leading motor manufacturers in the United States who send the majority of their work to us. We serve to-day many of the makers of the finest power plants on the market. Leading automotive engineers have expressed their approval of this process in unmistakable language. Our business is growing in proportion to the satisfaction we have been able to render to our clients. We solicit any test you desire to make.

In a few days your own engine will be taken down and overhauled for the coming season. That is the time to have our nearest service plant prove our claims. Write to our nearest branch for prices and be sure to state the number and size of your cylinders and the character of the defects.

L. LAWRENCE & COMPANY

BRANCHES

292 Halsey St., Newark, N. J.
791-3 Eleventh Ave., New York City.
1601 Summer St., Philadelphia, Pa.
1522 Michigan Ave., Chicago, Ill.
1246 Jefferson Ave., Detroit, Mich.
1810 Prospect Ave., Cleveland, Ohio.
18-26 Martin St., Milwaukee, Wis.
116 Hyde St., San Francisco, Calif.
335 Washington St., Los Angeles, Calif.
Licensees in Kansas City, Mo., and Cincinnati, Ohio.

Established 1862

DON'T FILL THIS IN

SEND for the full sized form which we will gladly mail on request. This big form will give you ample room to fill out the information in detail and comfort. You realize fully how important your propeller is, how much difference it makes to your boat whether it is right or wrong. We want to place at your disposal the necessarily vast knowledge of boats and propellers which we have accumulated. We want Columbian Propellers to render the utmost possible in service, dependability and speed. Write for this form to-day.

COLUMBIAN BRONZE CORPORATION

PROPELLER QUESTIONNAIRE

Every boat owner should realize the great advantage to him in equipping his boat with the most efficient propeller he can obtain. Efficiency means not only speed, but also economy in fuel consumption—using a propeller which will allow his motor the proper number of revolutions per minute. A motor running too fast is not economical and is subject to excessive wear. A motor running too slowly does not generate its full power and may be overloaded by the propeller, which would also cause excessive wear. We can often suggest a propeller that will produce more speed at the same number of revolutions.

Every motor boat owner seriously considers the design of his hull and the selection of a proper power plant for his craft. To change his engine power into the proper and most economical boat speed, the propeller is the one and only agent made use of. Few realize that even with the best and most efficient design of hull and engine the efficiency of the whole outfit will be greatly reduced if the wrong propeller is used. Results which were expected, and should be obtained, will not be. An error in the choice of the proper propeller may make an otherwise correct and expensive outfit of little use. It may cause him to condemn the motor or the design of his boat, or both.

It has been our aim for the past ten years to educate boat owners up to the meaning of propeller efficiency, and to assist in the selection to every boat would have the most efficient propeller. Our booklet, "PROPELLERS IN A NUT SHELL," was the first publication offering propeller information and speed and power tables for the boat owner, and the COLUMBIAN line of propellers is the only complete line of propellers providing any diameter, pitch or blade area necessary to meet any requirement.

It is clear that we must depend entirely upon you for the information in regard to your boat, and that for intelligent consideration of propeller problems, we must have information as complete and accurate as possible. Inaccurate dimensions, or guessing at the number of revolutions per minute, or the speed of the boat, usually leads to failure upon the part of the propeller selected to accomplish what is expected. We therefore urge our customers to see that all dimensions are taken from accurate measurements, revolutions taken with a revolution counter and speed data determined by accurate test. If you will fill in the attached questionnaire to the best of your ability and return to us, we will suggest what we believe to be the most suitable propeller.

If a propeller is to be selected for a boat already in use, performance trials over some course, the length of which is accurately known, offer very valuable data for us in selecting propellers. The pitch of a propeller, the number of revolutions at which it turns, and the average speed of the boat over some measured course, enable us to figure the slippage, which offers the best indication as to the performance of the hull, and a basis for calculations to determine the most efficient propeller for the boat.

COLUMBIAN BRONZE CORPORATION
50 CHURCH STREET NEW YORK, N. Y.

PROPELLER QUESTIONNAIRE

COLUMBIAN BRONZE CORPORATION

50 CHURCH STREET, NEW YORK

Answer all questions if you can. The more information we have the more accurately we can advise you.

Your name.....
Street..... Town..... State.....
Name of your boat.....
For what purpose is your boat used?.....
.....
Is your boat of light or heavy construction?.....
What speed in miles per hour does it now make?..... actual trials..... or estimated.....
How fast did your propeller turn in making that speed? (actual, don't guess)..... R.P.M.
What speed do you think your boat should make?.....
Does stern settle down when running full speed?..... How much?.....
What make of engine now used in boat?..... Model.....
Number of cylinders..... Bore..... Stroke..... Cycle.....
What make of engine to be used?..... Model.....
Number of cylinders..... Bore..... Stroke..... Cycle.....
Rated Revolutions per minute of engine full load?.....
What actual engine r.p.m. do you obtain with present propeller?..... R.P.M.
What r.p.m. do you wish the engine to turn?..... R.P.M.
What make of propeller do you now use?..... Style.....
What is diameter of present propeller?..... Pitch..... No. Blades.....
How large a wheel can you swing allowing 1 in. clearance?.....
What is diameter of propeller shaft?.....
Is length of hub limited?..... What can maximum length be?.....
Should hub be bored straight or tapered?.....
If tapered what are dimensions of large end?..... Small end..... Length.....
If straight bored should set screws be furnished?..... Size.....
What are dimensions of key way?..... Depth..... Width.....
Do you want a right or left hand propeller?.....

Note: Rotation of propellers for single or twin screw is considered from a location outside of the boat, looking toward its stern thus:

See reverse side and carefully fill in all dimension spaces and answer remainder of questions.

(OVER)

SPEED TRIAL DATA

In timing your boat use stop watch if you can. It will give elapsed time easily and accurately.

Name of Boat..... Date of Trials.....
Description of Course—Ocean..... Sound..... Bay..... Lake..... River..... (Check which)
General Direction of Course..... Direction of Wind..... Approx. Speed of Wind.....
Location of Course.....
Length of Course..... Estimated or Measured.....
State whether Nautical or Statute Miles..... Estimated speed of tide or current.....

Make three runs over the course each way, six runs in all, then average each trip and average the three trips, as indicated below. If you do not understand this, show the time of start and time of finish and we will figure it.

Revolutions of engine should be taken accurately on each run with a revolution counter. Don't guess. You can't guess right. Speedometers are often inaccurate.

Is propeller shaft coupled direct to engine or geared as in some hydroplanes?.....
What gear Ratio?.....

	1st Trip		2nd Trip		3rd Trip	
	Run No. 1	Run No. 2	Run No. 3	Run No. 4	Run No. 5	Run No. 6
Revolutions per minute (R.P.M.) each run						
Time of finish of run (B)						
Time of start of run (A)						
Elapsed time, subtract A from B						
Elapsed time in seconds						
Elapsed time per mile in seconds						
Speed miles per hour (Divide 3600 by the elapsed time per mile in seconds)						

TO GET THE AVERAGE SPEED, FILL IN THE FOLLOWING FOR EACH TRIP.

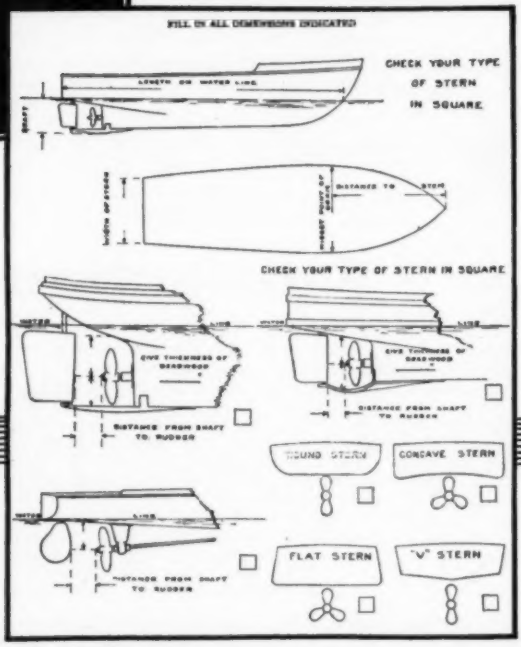
	1st Trip	2nd Trip	3rd Trip
Speed in Miles per hour with Current			
Speed in Miles per hour against Current			
Add the two			
Average Speed of Trips (Divide by 2)			

Average Speed of 1st Trip.....
" " " 2nd "
" " " 3rd "
Add the three
Average (Divide by 3)

Shows average speed of boat in miles per hour or knots, according as the length of the course is in Statute or Nautical Miles

PROPELLER USED

Make of Propeller.....
What style..... or Width of Blade..... in.
Number of Blades.....
Diameter..... Pitch.....
Expanded Blade Area..... sq. in.



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Columbian Bronze Corporation

Executive Offices: 50 Church Street, New York City

New York City Local Salesroom: Concourse, 50 Church St., Factory, Freeport, L. I.

Address all correspondence to the Executive Offices except for New York City Sales

Advertising Index will be found on page 140

"Mullins Boats" *Means* "Can't Sink"

Equipped with air chambers fore and aft like a lifeboat. Built of puncture-proof steel plates like a torpedo boat. All the buoyancy of a wooden boat with none of its faults—can't leak, warp, waterlog or open at the seams. More than 60,000 in use.

Write for our big catalog showing 40 models of power boats, rowboats and canoes in steel and wood.

The W. H. MULLINS CO. 600 Franklin St. Salem, Ohio

World's Largest Manufacturers of Steel and Wooden Pleasure Boats

Mullins Twenty-foot Auto Boat

Mullins Fourteen-foot Outboard Special

Mullins Eighteen-foot Leader Launch

Mullins Cedar, Canvas Covered Canoe, Charles River Model

MULLINS
STEEL BOATS CAN'T SINK

Wisconsin
CONSISTENT

-the Engine with a War Record

Lack of confidence in the engine mars no day's cruise for the owner of a WISCONSIN-equipped boat. The same built-in consistency and dependability that carried 15,000 WISCONSIN motors through more than a year of war with signal honors, make the marine-type richly worth the little more that it costs the boat owner.

Power When You Want It

is the service a WISCONSIN renders. Ease of starting, economy of fuel, minimum of vibration, simplicity of adjustment and uniform reliability of operation have made the WISCONSIN the recognized standard of motor boat engines. It marks the craft that floats it as a bred-in-the-purple product.

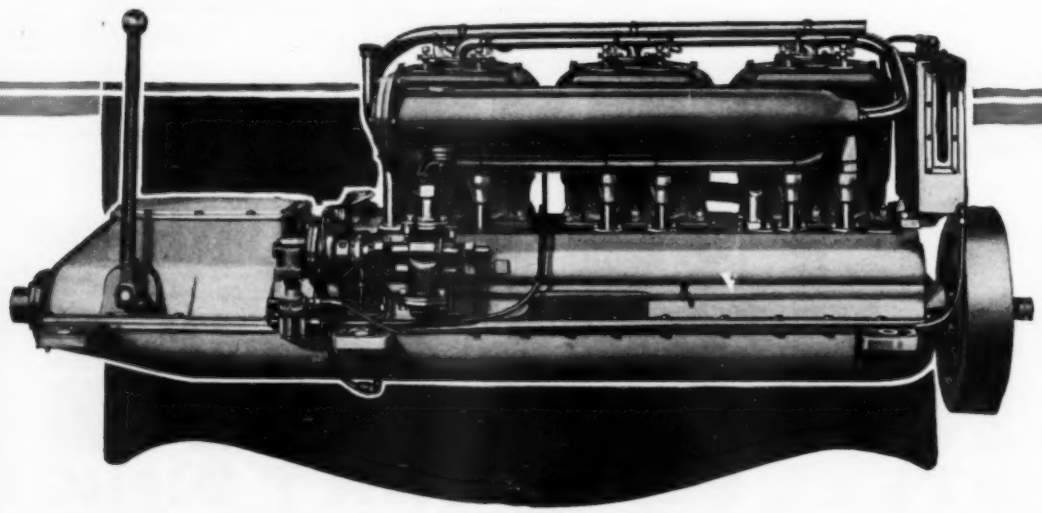
A letter will bring some interesting records and gasoline power facts.

WISCONSIN MOTOR MFG. CO.

Section A, Dept. 302, Milwaukee, Wis.

DISTRIBUTORS:

New York Branch, T. M. Fenner, 21 Park Row, Factory Rep.
Marine Equipment and Supply Co., 610 Arch St., Phila., Pa.
Pacific Coast Distributor: Earl P. Cooper Co., 1310 So. Los Angeles St., Los Angeles, Cal.



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Immediate Delivery

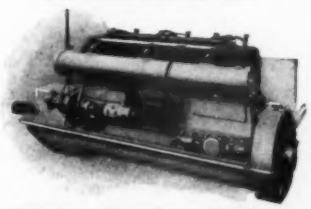
THE FOLLOWING

Speedway Products

SPEEDWAY CRUISER
Length, 52'; Beam, 11'4"; Draft, 3'0".
4 Cylinder 75 H.P. Speedway Motor.
Speed, 14 miles per hour.

A NEW STOCK MODEL

Speedway

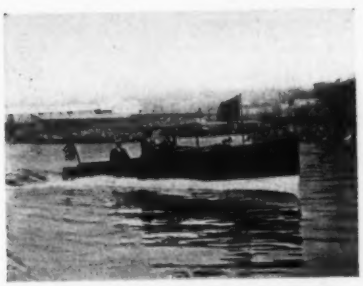


Marine Gasolene Engines

Reliable—Efficient—Economical

H.P.	Cyl.	Bore	Stroke
	HIGH DUTY		
22-28	4	4	4½
35-44	4	4½	5½
50-66	6	4½	5½
130-150	6	5¾	7
175-200	8	5¾	7
	MEDIUM DUTY		
48-75	4	5¾	7
75-130	6	5¾	7
100-175	8	5¾	7
	HEAVY DUTY		
80-115	6	6¾	8½
120-160	6	8½	10
200-250	6	11	12

Speedway



Runabouts

Fast—Comfortable—Seaworthy

Length	Speed
35'	27 Miles
32'	22 "
25'	17 "

Gas Engine & Power Company

and

Chas. L. Seabury & Company, Consolidated

MORRIS HEIGHTS NEW YORK

MOTOR BOATING PRACTICAL HAND-BOOKS

Every motor boatman has long felt the need for a really complete and comprehensive library devoted to their favorite pastime—motor boating. One of the obstacles to the accomplishment of this important work was the difficulty in finding any one writer who could cover the field in its entirety. In presenting the new series of practical hand-books, MoToR BoatinG believes that the problem has been solved at last. These books are edited by Charles F. Chapman, M. E., the editor of MoToR BoatinG, and they are the results of months of untiring effort on his part, together with the best of thousands of suggestions sent to him by motor boatmen themselves. The list of the contents given below will give you some idea of the vast amount of ground covered by these volumes.

Practical Motor Boats and Their Equipment

Volume 1.—The first volume tells you what the ideal boat for various kinds of service should be and what to look for in buying a boat. Many suggestions about decoration and hints on all kinds of equipment. All about steering gears, wireless outfits, electrical attachments, etc. Glance over the list of contents appended herewith: Hulls, Ballast and Seaworthiness; Round Bottom *vs.* Sharp Bilge; What are the Advantages of Flare? Raised Deck *vs.* Trunk Cabin; Best Proportion of Beam to Length; Selecting a New Design; The Advantages of Bilge Keels; Open or Solid Deadwood? What Makes a Hull Seaworthy? The $1,000 Cruiser; Buying a Second-Hand Boat; Types of Bows and Sterns; Exterior Arrangement of Cruisers; The Best Cabin Arrangement; Finishing Up the Cabin; Changes in Interior Arrangement; Interior Arrangement for Open Boat; Propeller-Rudder Arrangements; Best Position for the Rudder; Advantages of the Outboard Rudder; Different Steering Positions; Steering Equipments for Motor Boats; Steering Gear for the Cruiser; The Steering Gear for a Runabout; Steering the Boat from the Side; The Electrical Equipment; Making and Wiring a Switchboard; Electric Lighting on a Motor Boat; The Inexpensive Lighting Outfit; Wiring the Small Cruiser; The Storage Battery; The Dynamo Cut-Out; Wireless for a Small Cruiser; Tender for a Thirty-foot Cruiser; Building a Folding Dinghy; Installing the Boat Boom; What is the Best Galley Arrangement; Ventilating the Galley; The Galley Stove and Its Installation; Making a Fireless Cooker; A Portable Cook Box; Running Water for the Cruiser; How to Build a Portable Table; A Table for the Open Boat.

Practical Motor Boat Building

Volume 2.—As its title implies, this volume takes up the building of your own boat. It also covers the construction of the necessary fittings such as awning, windshield, etc. Every boatman sometime or other builds a boat, and a book of this kind will save much time and prevent many mistakes. List of contents: Types of Motor Boat Fastenings; Boat Building Woods; Laying Down a Boat's Lines; Converting a Trunk-Cabin Cruiser; A Steam Box for Amateur Builders; Joiner Between Stem and Keel; Fastening the Frames and Floors; Boring the Forgotten Limbers; Fitting the Garboard Plank; Boring the Shaftlog; Fitting the Stuffing Box; The Stern Bearings for a Cruiser; A Water-Tight Companionway; How to Canvas a Deck; Hinged Water-Tight Hatches; Making a Water-Tight Hatch; The Coaming of an Open Boat; Fitting a Swinging Port Light; Making a Self-Bailing Cockpit; A Water-Tight Window Sash; Making a Water-Tight Skylight; How to Build an Engine Housing; How to Make an Engine Cover; Building a Tool Locker; Constructing an Extension Transom; How to Make a Pipe Berth; An Ice-Box for a Cruiser; Installing a Toilet; How to Rig a Signal Mast; How to Make a Spray Hood; Fitting a Folding Windshield; An Awning for the Open Boat; A Cover for the Open Cockpit; Screens for the Side Light; A Support for the After Light; A Seat for the Man at the Wheel; Removable Davits for the Cruiser; The Boarding Steps; A Bow Rudder for Your Hydro; The Motor-Driven Club Tender.

Practical Things Motor Boatmen Should Know

Volume 3.—Navigation is one of the important subjects covered in volume three of the series. Tells you how to steer, how to increase the factor of safety, and a host of other things relative to the proper running of your boat. The chart and compass are both fully explained in a clear and comprehensive manner. The list of contents will tell you more about it; Advice for the Beginner; Lessons Learned from Experience; Good Things to Know; Increasing the Factor of Safety; Which Way Should the Boat Steer? Why a Boat Steers Badly; Why do Boats Squat? Figuring the Boat's Speed; Ballasting the Cruiser; Getting Off Bottom; To Ride Out a Storm in a Motor Boat; The Why and How of Storm Oil; Preventing Fire; Handling Ground Tackle; Government Charts; Stowing the Anchor on a Cruiser; Diminishing Deviation; Preventing Electrolysis; Stowing and Using Charts; How to Make a Chart Case; Keeping a Motor Boat's Log; How to Make a Sextant; Tides and Tidal Waters; Taking Her Through the Canals; The Best All Round Dinghy; Towing the Tender; Handling the Dory in a Seaway; Getting the Tender Aboard; Planning for a Cruise; Equipping for a Cruise; Equipment for Offshore Cruising; Novel Events for Regatta Day; Handicapping; The Object of a Handicap Rule; Laying Off a Race Course; Measuring the Length of a Race Course; Preparing a Boat's Bottom for a Race; How to Build a Turning Buoy; Starting Boats in a Race; Stowing the Signal Flags; Fitting a Gun Mount; A Fish Box for Your Cruiser; A Cabin Wall Rack.

Practical Marine Motors

Volume 4.—All about the marine motor; what it should and should not be. Tells why the automobile engine is unsuccessful in marine work. The best location for your engine, the ideal engine bed, the fuel tank, exhaust and countless other suggestions that will enable you to get the best results from your power plant. List of contents: Purchasing a Marine Motor; How Many Cylinders? Power per Cylinder; High Speed *vs.* Heavy Duty; Long Stroke *vs.* Short Stroke; Correct Motor Design; Changes in One's Power Plant; The Things that Cause Vibration; The Automobile Engine for a Boat; The Best Position for the Motor; The Ideal Engine Compartment; Placing the Engine in the Hull; Installing a Motor in a Canoe; Installing Power in a Yawl; Converting a "Banker" to Power Engine Installation in a Hydroplane; Putting Power in the Rowboat; Limits of Shaft Inclination; Constructing the Engine Bed; Getting the Motor Aboard; Lining Up the Propeller Shaft; The Best Exhaust; Mufflers *vs.* Under-Water Exhausts; Installing an Under-Water Exhaust; Primary Batteries for Ignition; Keeping the Ignition System Dry; Installing a High-Tension Magneto; From Make and Break to Jump Spark; Installing the Gasoline Tanks; Taking Care of Extra Gasoline; Spark and Throttle Controls; Constructing a Rear Starter; Propeller for Engine and Hull; Installing a Universal Joint; Gearing Motor to Propeller Shaft; The Automobile Throttle; Harnessing the Main Engine; Rebabbitting a Worn Bearing; Should Fuel Line be Inside or Outside.

Practical Motor Operation and Maintenance

Volume 5.—One of the most valuable books of the entire set. Your motor's ills and how to cure them. This volume tells you how to adjust your carburetor, how to fit piston rings, how to remedy poor compression and a number of other things that will enable you to doctor your own motor. List of contents: Locating the Motor's Troubles; The Overheated Motor; Starting in Cold Weather; Overhauling a Marine Motor; How to Save Fuel; The Fuel Situation; Using Low Grade Fuel; How to Run on Kerosene; Supplying the Fuel to the Carburetor; Adjusting the Carburetor; Cleaning the Fuel Tanks; Cleaning the Gasoline Line; Stopping Up the Leak in the Tank; A Home-Made Gasoline Gauge; Carrying an Extra Supply of Oil; Mixing the Fuel and Lubricant; Remedying Leaky Compression; Killing the Carbon Jinx; Tool and Spare Parts to Carry; Removing and Replacing Piston Rings; Repairing a Leaky Cylinder; Grinding a Motor's Valves; Setting the Valves; Timing the Ignition System; Cleaning the Water Jacket; Making and Fitting a Gasket; Patching Up a Bearing; Straightening the Sprung Shaft; Truing a Bent Propeller; Removing the Flywheel; Separating Couplings and Pipe Fittings; Changing the Shaft Hole Location; Utilizing the Exhaust; Disposing of the Bilge Water; Heating a Small Cruiser's Cabin; Operating the Outboard Motor; The Clean and Quiet Boat; Charging a Storage Battery; When the Motor Stops Unexpectedly; Making a Unit Power Plant.

Practical Suggestions for Handling, Fitting Out and Caring for the Boat

Volume 6.—This volume is an especially valuable one. You will find in it points covering the care of your boat that you never dreamed of before. Whether you are a beginner or a finished expert this book will give you a better knowledge of the handling of your craft than you can imagine. List of contents: Putting the Boat into Commission; Fitting Out a Thirty-Footer; Suggestions for the Beginner; Refinishing Bright Work; Keeping the Wood Surface Bright; Putting the Boat Out of Commission; Laying Up an Unsheltered Boat; Hauling Out for the Winter; Covering the Boat for the Winter; Launching from a Wharf; Correcting Faults; Lengthening Out the Boat; Moorings and Buoys; Taking Steps to Safeguard the Anchor; What to Use in the Bilge; Preserving the Wood in Boats; Emergency Rigs for the Cruiser; Auxiliary Sails for the Cruiser; Providing an Emergency Rudder; Preparing for Southern Waters; Stopping the Troublesome Leak; Replacing a Broken Plank; Removing Broken Lag Screws; Raising the Boat's Stern; Clearing the Propeller; Protecting the Bow and Stern; Open Boat Sleeping Quarters; Ventilating the Cabin of Small Cruisers; Converting the Open Boat to a Cruiser; Making a Cover for the Open Boat; Preventing Electrolysis; Building a Club Float; A Floating Boathouse; Constructing a Landing Stage; Building the Marine; Keeping the Thief Out; A Place for Your Shore Clothes; Stowing for Life Preservers; The Winter's Alterations; What Changes Shall I Make; The Satisfactory Bilge Pump; The Pressure Water System; Making a Pelorus; Your Storm Curtains; Life-Saving Equipment; The Absent Owner's Anchor Light; Mounting the Reverse Gear.

Price $1.25 per volume, or $6 per set of six volumes of over 1,000 pages.

The books measure 7 x 10 inches and are handsomely bound in cloth. Each volume is fully illustrated and printed in clear type on fine paper.

MoToR BoatinG **119 West 40th Street, New York**

Advertising Index will be found on page 140

The Entering Wedge

The Up-to-Date Way of Building a Manufacturing Business to National Proportions, Taking the Well-Known Paragon Reverse Gear as an Example

IN compiling the record of man's advancement, historians have adopted certain slogans as symbolizing the factor that played the most important part in the affairs of each particular period. Thus we have the stone era, the iron era and the bronze era; each slogan indicating in unmistakable terms the agency that contributed in largest measure to the welfare of the world at the time.

When the history of the twentieth century comes to be written many writers will unquestionably refer to it as the advertising era. This dominant business force is sure to be recognized by historians as a big factor in determining the degree of progress made during our time.

It is safe to say that no one agency has contributed so much to commercial advancement as the power of the printed word—advertising. It has so changed mercantile practices that the old-time methods of conducting business have become practically extinct. The principles underlying present day manufacturing and distributing are as unlike those governing our efforts in former days as anything could possibly be; these changes have been brought about by a broader conception of the possibilities of consistent publicity.

Taking for a concrete example the Paragon Reverse Gear, without question one of the most consistently advertised products in the marine market. This article is intended to point out how and why modern advertising acts to better the quality of a product, reduce its manufacturing and selling cost, and save money for the consumer, the middleman and the producer—in this case the boat owner, the agent and engine builder, and the manufacturer.

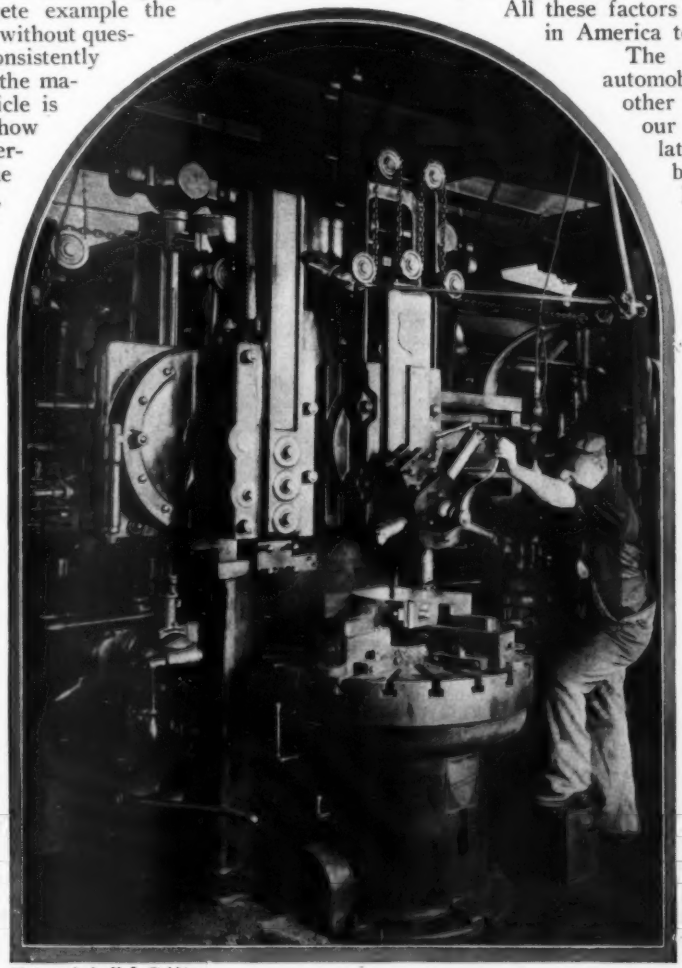
The dictionary tells us that advertising is "informing of one's wishes or intentions by a public notice". The definition is woefully inadequate. Advertising is infinitely more than a means of selling goods that would otherwise be sold by a salesman. Advertising is the force that creates nation-wide demand for the productions of millions of workers. Advertising is the force that makes it possible for the man who owns a motor boat to buy a Paragon gear whether he happens to be in New York, Chicago, Paris, Vladivostock or Singapore. Advertising is the force that enables a corps of thirty salesmen to do the work of a hundred and do it quickly and more effectively at less expense. Advertising is the force that keeps over 100,000,000 people knit closely together although separated by mountains, rivers, and valleys. Advertising is the force that made conscription, Liberty Bonds and hundreds of other war-time activities so conspicuously successful.

America stands out today as the best informed nation in the world and it would be unfair to refrain from giving much or most of the credit to the power of skillful publicity. It is the marvel of Europe that the masses in this country are so well informed on such a wide variety of subjects. In determining the reason for this most Europeans admit that it is due to the high development and wide circulation of American publications.

The sale of books in America is much greater than anywhere else on earth. The works of the most famous authors are found on the shelves of almost every member of what is called the working class. The study of technical books has been popularized through the widespread publicity of correspondence schools. All these factors have reduced illiteracy in America to a negligible quantity. The advertising of boats, automobiles, books and every other article that enters into our daily life, has stimulated the public desire for better things of all kinds. It explains in part the American standard of living. It offers an incentive to the worker to improve his earning power and increase his ability to buy. It is an incentive for the manufacturer to produce a better article in order that the superior quality may serve as the foundation of a successful advertising campaign.

After all is said and done, the consumer's prime interest in advertising is narrowed down to the question of what it does for him. Let us emphasize right here that the benefits conferred on the consumer by publicity are innumerable. A printed advertisement is a bond of good faith and this fact is generally recognized by buyer and seller alike.

Advertising results in price levelling. The



Photographs by N. L. Stebbins

A giant boring mill in action at the Paragon Plant

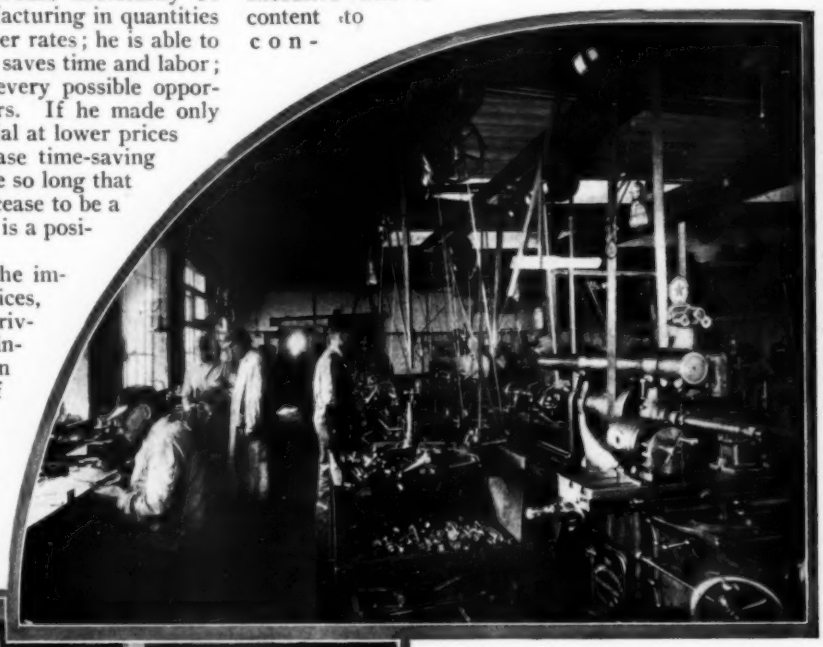
manufacturer who desires an exhorbitant profit could not possibly be successful because his advertising competitor selling at a fair price would secure all of the business. This law of competition cannot be overcome —other things being equal, there can be but little price deviation in articles of similar merit.

Advertising lowers prices by decreasing selling costs and stimulating production. Big production is the most important factor in the establishment of low manufacturing costs. If Henry Ford manufactured only 2,000 cars per year the selling price would necessarily be much higher than it is. By manufacturing in quantities he is able to obtain material at lower rates; he is able to invest in expensive machinery that saves time and labor; he is able to take advantage of every possible opportunity to lower his cost and yours. If he made only 2,000 cars he could not buy material at lower prices than others; he could not purchase time-saving machinery because it would lie idle so long that its money-saving qualities would cease to be a factor. Big production therefore, is a positive reducer of selling prices.

While quantity production is the important factor in lowering prices, there would be no excuse for striving for it if an outlet for the increased production had not been provided. The mere building of millions of cars, for instance, would not lower prices unless every single car could be sold. So once again we resort to the power of advertising. Publicity creates a market for the increased output. Publicity does not make single sales—it sells in quantities. It forces demand surely—it creates the prospect and sells him at the same time. It lowers selling costs to a point that could never be approached by personal selling methods. So we find that advertising benefits the consumer by making big production possible and lowering the manufacturer's cost of placing his goods in your hands.

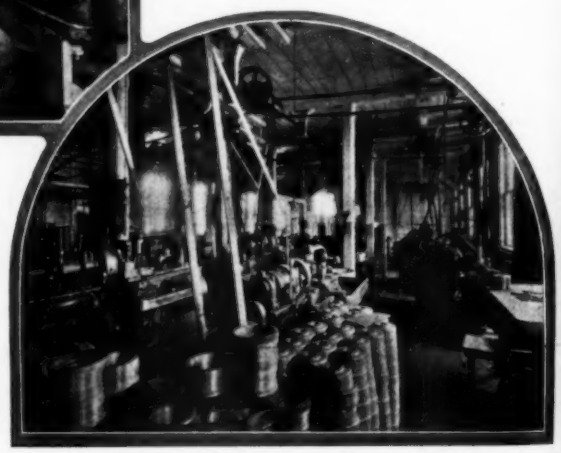
Advertising makes for business honesty. To make advertising pay, the advertiser must rely on securing a definte proportion of good-will in addition to actual orders. The far-sighted manufacturer wants to make friends as well as customers. The best assets in any business are pleased clients; the biggest liabilities are those who are dissatisfied. The progressive merchant strives to satisfy you for purely selfish reasons—he knows that he cannot hope to hold your patronage if he gives you discourteous or dishonest treatment. The advertiser cannot afford to fail you because he has invested money in an effort to make you a booster for him.

Just as advertising indicates advancement in civilization so does the use of the power of advertising indicate progressiveness on the part of the advertiser. The executive who is content to conduct his business as his father and grandfather did seldom uses advertising space, and the condition of lethergy that governs the distributing end of the business is almost sure to prevail in the manufacturing or production departments. In other words, the unprogressive non-advertiser rarely makes improvements in either the conduct of his business or the product that he makes. The



Part of the tool room, a small completely equipped machine shop in itself

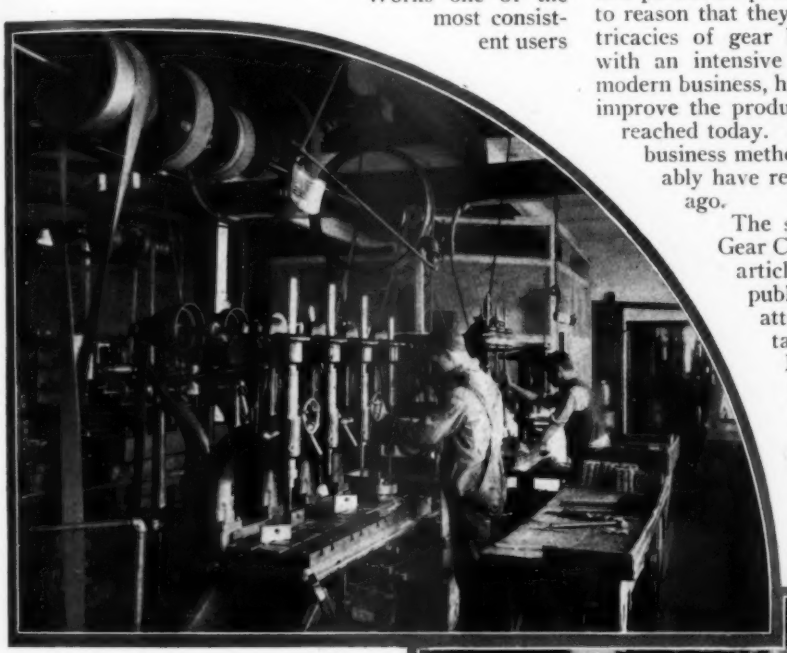
Lower end of assembling and shipping department



A new steel and cast iron automatics

newer developments in the construction of all kinds of machinery are usually made by those organizations who have adapted themselves to modern influences. Many radical changes have been made in the last twenty years —changes that upset the time honored traditions of industries from end to end. And in practically every case the men who have had the nerve to make these changes have been those who practiced the newer methods of conducting every department of business.

As an instance of this fact, we find the Paragon Gear Works one of the most consistent users



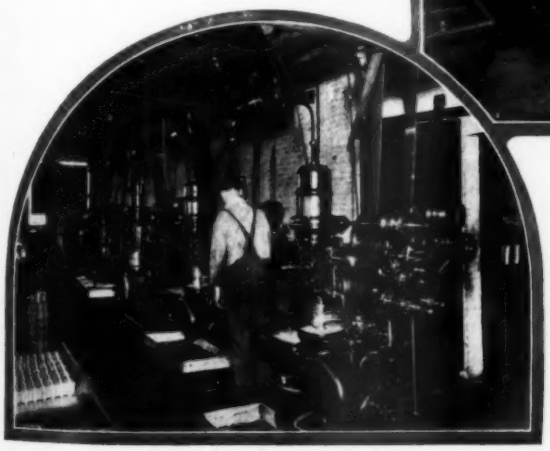
A couple of multiple spindle drill presses

of large advertising space in the boating magazines. Boatmen all over the country, all over the world in fact, are familiar with the goodness and dependability of this product because the merits of Paragon Gears have been proclaimed month after month in the boating magazines by use of full-page, two-page and insert advertisements. In this issue of MoToR BoatinG sixteen full pages are used to inform you and every other boatman about the Paragon gear—to tell you what it has done, what it is doing and thereby infer what it will do for you. This is the spirit of progressiveness that governs the selling end of that business.

The same spirit, developed on an even broader and more comprehensive scale, controls the activities of the manufacturing department. Certainly no manufacturer has contributed more to reverse gear construction than the Paragon Gear Works. They have specialized on this particular product for so many years that it stands to reason that they must thoroughly understand the intricacies of gear building. This experience, coupled with an intensive belief in the progressive spirit in modern business, has resulted in a continual endeavor to improve the product to the point of perfection it has reached today. Had they been satisfied with former business methods the Paragon product would probably have remained the same as it was ten years ago.

The sixteen-page insert for the Paragon Gear Company that immediately follows this article is a striking example of modern publicity methods. If Paragon salesmen attempted to deliver the message contained in this big insert to every MoToR BoatinG reader it would take twenty of them over one year to do the job and they could not do it as effectively as this advertisement will do it. The effects of advertising of this kind are never-ending. Years and years from now Paragon Reverse Gears will be specified by people who were first

Looking across the northeast wing



Battery of gear shapers

impressed, consciously or unconsciously, by the story appearing on the following pages. Paragon good-will has been and will be maintained forever by building a product of unvarying excellence and proclaiming the fact in attractive and widely circulated advertisements.

We mentioned earlier in this article the progressiveness of manufacturers as reflected by their advertising methods. In this connection a few words about the Paragon plant and product will not be amiss. The illustrations appearing on this and other pages convey but a remote idea of the scope of the Paragon organization. This manufacturer builds today a reverse gear that is second to none, yet the

day will come when they will produce a better one. It's inevitable—constant research by skilled experts will some day result in an improvement that cannot be foreseen today. No one masters anything beyond improvement and that is why the more progressive manufacturers maintain expensive laboratories for constant experiment. The Paragon Gear Company believe that they know all there is to be known about reverse gear construction at the present moment, but they expect to know a great deal more about the subject in coming years. As the world moves so will they—and so will other manufacturers who strive to advance in their calling.

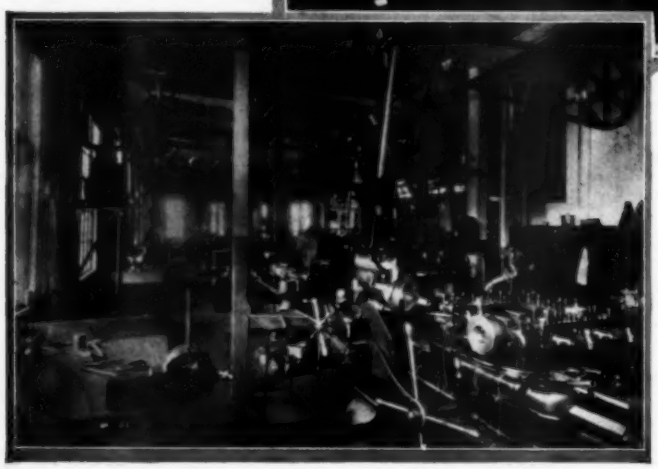
The Paragon Reverse Gear is now used as standard equipment on some thirty or forty of the leading marine engines on the market, as well as being optional equipment on many others, yet it is only a short time ago when reverse gears were considered as something entirely separate from the power plant. From a practical standpoint the reverse gear is just as much a part of the engine as the crankshaft or any other vital part. Manufacturers have come to realize this fact and the reverse gear is now considered as an integral part of the motor itself. The engine builder is therefore exacting in his demands because the breakdown of the reverse gear would result in general dissatisfaction with his engine.

Most boatmen are convinced that the reverse gear is just as necessary on the motor boat as the brake on the automobile. It increases the factor of safety, in fact it makes the handling of the boat as simple and safe as the operation of a motor car. It minimizes the danger of accidents and misjudgments in landing or the sudden emergencies encountered on the water.

Paragon Gears are made in several types and in sizes to transmit from 4 h.p. per hundred r.p.m. up to 60 h.p. or more per hundred r.p.m. Every Paragon Gear has a patented self-centering non-dragging type of multiple disc clutch, a prominent point in Paragon construction. Other principles underlying the construction of the Paragon commends it to boatmen who demand much from their boat and its equipment.

The Paragon Gear Company use large advertising space in the boating publications to tell you these things and keep you informed on a subject that every boatman is interested in. Advertisements similar to this are an education in themselves, and this is particularly true in the marine field. The degree of efficiency you attain in the operation of your boat is largely dependent on the equipment you provide. The finest hull ever made will not produce maximum results with an inefficient power plant, and the fact that you own an unsatisfactory motor may be due to the fact that you were never fully informed about marine engine requirements and construction.

A few miscellaneous machines in the new addition



A line of turret lathes in the general machine shop

The same thing applies to everything used on the boat from stem to stern. The advertisements keep you informed about all the new devices on the market and at the same time they suggest means of making the operation of your boat a still greater source of pleasure and profit. How often have you found that some product costing but little money has saved many dollars for you, and that it was first brought to your attention by an advertisement appearing in one of the boating magazines.

Advertising is a safeguard against unwise buying with its consequent regrets. When you respond to advertisers you take advantage of definite statements and policies that have become a matter of record through widespread publicity.

At this season of the year the announcements of the leading manufacturers are obviously of more than usual importance to the owner of a boat. During the months of April and May boatmen spend most of their spare time in the yards, fitting out and getting ready for the approaching summer. Engines are overhauled and the whole boat is done over thoroughly so that nothing will be lacking to make the season an enjoyable one. It is then that the advertising pages of the magazine render greatest assistance. They tell about the new things on the market and they suggest many ways of increasing the comfort and service of boating.

The Friends Paragon Has Made

"Promises may get friends, but it is performance that must nurse and keep them."

Feltham "Resolves."

Engine Builders Using Paragon Reverse Gears as Standard Equipment

Anderson Engine Co.
The Bridgeport Motor Co., Inc.
Camden Anchor-Rockland Machine Co.
The Canadian Fairbanks-Morse Co., Ltd.
The Clay Engine Mfg. Co.
C. B. Cottrell & Sons Co.
The H. C. Doman Co.
Fay & Bowen Engine Co.
The Frisbie Motor Co.
Fulton Manufacturing Co.
The Gaeth Motor Co.
J. S. Gaffga & Co.
Gray Motor Co.
Knox Motors Co.
J. W. Lathrop Co.
Mianus Motor Works
Miller Engine Co.
Missouri Engine Co.
Murray & Tregurtha Co.
The New London Ship & Engine Co.
Red Wing Motor Co.
The Remington Oil Engine Co.
Scripps Motor Co.
The Stanley Co.
The Terrington Co.
Van Blarck Motor Co.
Wisconsin Motor Mfg. Co.
The Wright Machine Co.

Automatic Machine Co.
Commonwealth Motors Co.
Hall-Scott Motor Car Co.
Hettinger Engine Co.
Hulse Bros.
Regal Gasoline Engine Co.
Straubel Machine Co.
Vim Motor Co.

PARAGON GEAR WORKS
TAUNTON, MASS.

ANDERSON ENGINE COMPANY

INTERNAL COMBUSTION ENGINES

4036 NORTH ROCKWELL STREET

CHICAGO, U. S. A.

February 21, 1919

Paragon Gear Works

Taunton

Massachusetts

Gentlemen:

We have yours of the 18th, asking our reasons for adopting the Paragon Reverse Gear. It is so long since we began using this Gear, that we should hardly be expected to remember the exact reasons for adopting it. Surely there were quite a few of them, but you undoubtedly will be just as much interested in knowing why we continued to use this gear year after year.

In the first place it is well designed, also neat and compact. It is well constructed too, of the most suitable materials, and is easy to operate and adjust. The Horse Power Ratings given it are conservative. The personality behind it helps some also, but it is the Satisfactory Service it gives that makes it so popular. It is a Real Asset to any Good Marine Engine.

Hoping the above gives you the information desired, and wishing you continued success, we remain,

Yours very truly,

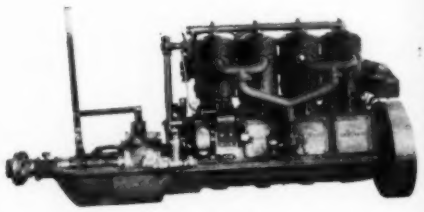
ANDERSON ENGINE COMPANY

Manager

ANDERSONS ARE GOOD ENGINES

"—it is the Satisfactory Service it gives that makes it so popular."

W. C. ANDERSON, Manager.



PARAGON

Bridgeport

THE MOTOR THAT MOTES

ABSOLUTELY NON-BACKFIRING

BRIDGEPORT, CONNECTICUT

March First

1919

The Paragon Gear Works

Taunton

Massachusetts

Gentlemen:

You are aware that we have been using your Paragon Reverse Gears in connection with Bridgeport Motors for a great many years, and our experience with them has been most satisfactory.

On our larger sizes, we build the reverse gear on the motor as standard equipment.

The illustration which we are sending you will be of interest. This shows one of our Heavy Duty Four Cylinder Four Cycle Motors, cylinders 7½" x 9", which we give a conservative rating of 50 H.P. at 375 R.P.M.

This motor is extremely powerful, handling a three-blade propeller 40" diameter with 32" pitch and actually delivering between 60 and 65 H.P. at the propeller speed mentioned.

Your E-Special Paragon Gear proves a very successful installation on this outfit.

Yours very truly,

THE BRIDGEPORT MOTOR CO., INC.

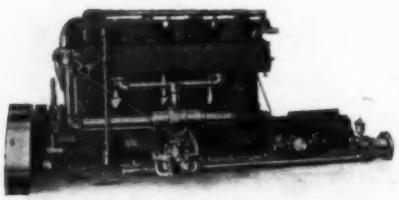
H. O. Cram

Sales Superintendent

Bridgeport

"Your E-Special Paragon Gear proves a very successful installation."

H. O. CRAM, Sales Supt.

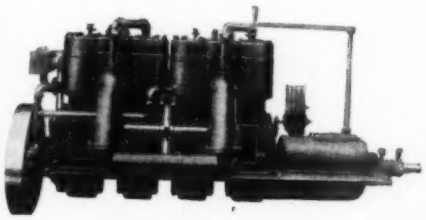


Advertising Index will be found on page 140

KNOX

"Your C-special gear stands up under this work very remarkably, ——"

JOHN BIRD, Manager.



CAMDEN ANCHOR-ROCKLAND MACHINE CO.

KNOX MOTORS — KNOX CARBURETORS — KNOX LAUNCHES

Camden, Maine, U.S.A.

February 27, 1919

Paragon Gear Work:
Taunton, Mass.

Gentlemen:

We take this opportunity to inform you that the Paragon Reverse Gear we have been using on our Knox motors for the past several years has given us excellent satisfaction.

Your Paragon Gear, Model C-Special we have used quite extensively on our 25 and 30 H.P., heavy duty Knox motor, with very satisfactory results. These motors are usually installed in Tow Boats and Heavy Commercial Boats.

The engines are started, stopped, and reversed very frequently, sometimes under extremely heavy loads. The strain and wear on the gear is quite unusual. Your C-Special Gear stands up under this work very remarkably, and we are using this gear now exclusively on this particular engine.

We did not, however, accept this gear until we had tried out several other makes.

Very truly yours,
Camden Anchor-Rockland Machine Company
John Bird
Manager

REVERSE GEARS

MONTREAL. QUEBEC. OTTAWA. TORONTO. HAMILTON. WINDSOR. WINNIPEG. SASKATOON. CALGARY. VANCOUVER. VICTORIA.

THE CANADIAN FAIRBANKS-MORSE COMPANY
LIMITED
Cable Address FAIRBANKS

Factories
Toronto, Ont.
Sherbrooke, Que.

F.W. Evans, Manager.

26-28 Front Street W.
TORONTO, ONT.

March 10, 1919

Messrs:
The Paragon Gear Works
TAUNTON, MASS., U.S.A.

Gentlemen:

For a number of years we have been using Paragon Gears on Fairbanks Morse Marine Engines, 12 H.P., and larger. These engines are distributed throughout the Dominion of Canada, and in many instances go to points far removed from ordinary means of transportation.

In addition to building an absolutely reliable engine, it is necessary to equip the engine with reliable accessories, and it is this consideration that induced us to standardize on the Paragon Gear, and our experience has proven that our confidence was well placed.

Yours very truly,
THE CANADIAN FAIRBANKS MORSE CO.,
Limited,

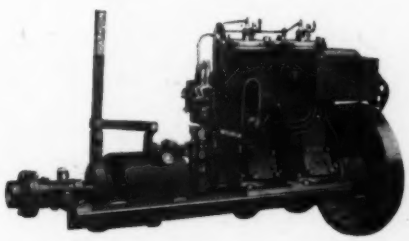
G. B. Wheeler

Engine and Accessory Department.

FAIRBANKS-MORSE

"—our experience has proven that our confidence was well placed."

G. B. WHEELER.



THE CLAY ENGINE MANUFACTURING CO.

CLAY HEAVY DUTY FOUR CYCLE ENGINES MARINE AND STATIONARY

CLEVELAND, O., U. S. A.

March 4, 1919

Paragon Gear Works
Taunton
Massachusetts

Gentlemen:

Our concern has been building Honest Clay Marine Engines for a period of twenty-two years. We have installed the Paragon Gear on them ever since your concern has been building them.

During this time we have equipped single, two cylinder, and four cylinder engines from four to one hundred horse power with your gears, and they have always proven very satisfactory. In fact, we specialize on heavy duty slow speed engines and most of our engines are given the most severe strains that marine engines can be put to.

They are used in fishing, towing, and general supply boat use. Under these extreme tests we are pleased to advise you that the Paragon Gears have always stood up so well that we have never had a complaint from any of our users concerning them.

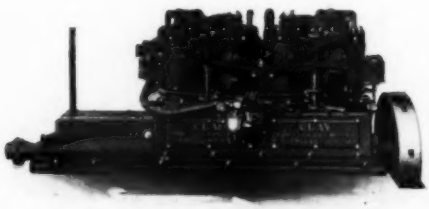
Very truly yours,

THE CLAY ENGINE MFG. COMPANY.

SECRETARY

HONEST CLAY HEAVY DUTY

"—have always stood up so well that we have never had a complaint."
JEROME N. HALLE,
Secretary.



PARAGON

COTTRELL-HOLMES
Gasoline
Motor

"—nothing but words of commendation to say regarding their performance."
C. B. COTTRELL
& SONS CO.

-NEW YORK-
PRINTING PRESSES
-CHICAGO-

EDGAR H. COTTRELL, PRESIDENT — CHARLES P. COTTRELL, TREASURER — ARTHUR M. COTTRELL, SECRETAR

C. B. COTTRELL & SONS CO.
WESTERLY, RHODE ISLAND

February 27, 1919

Paragon Gear Works
Taunton, Mass.

Gentlemen:

We would say in reply to your inquiry regarding our experience with the Paragon Gear that we selected this type of gear for use in connection with our Heavy Duty Twin-Six Motors, as used in our trial speed boat, for the reason that we considered them the best of anything in the market for the purpose. We had a chance to thoroughly test them out in the trials made during the season of 1918 and are pleased to state that they met our expectations fully and we have nothing but words of commendation to say regarding their performance.

Very truly yours,

C. B. COTTRELL & SONS CO.

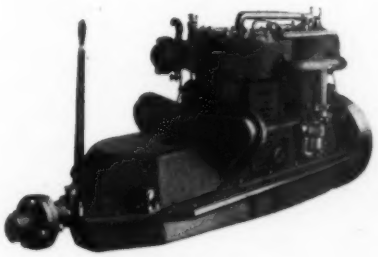
AHS-G

Advertising Index will be found on page 140

The DOMAN MARINE MOTORS

"—during our entire experience we have had no trouble with Paragon Gears."

D. A. MATTESON,
Purchasing Agent.



The H. C. Doman Co.
20 MP Tractor Engines

Oshkosh, Wis. U. S. A.

Paragon Gear Works
Taunton
Mass.

Feb. 20, 1919

Gentlemen:

Paragon Gears have been a standard equipment on Doman Marine Motors for many years. As one of your oldest customers we are in a position to know their worth, and during our entire experience we have had no trouble with Paragon Gears.

Our trade specifies and we recommend Paragon Reverse Gears as a strictly "No Trouble Gear."

THE H. C. DOMAN COMPANY

D. A. Matteson

PURCHASING AGENT

REVERSE GEARS

FAY & BOWEN ENGINE CO.

MANUFACTURERS OF

ENGINES AND POWER BOATS

GENEVA, N.Y. U.S.A. Feb. 24, 1919

Messrs. Paragon Gear Works
Taunton
Mass.

Dear Sirs:

The fact that we have used Paragon gears on our engines for approximately nine years is the best proof that we can give of our opinion of them.

Yours most truly,

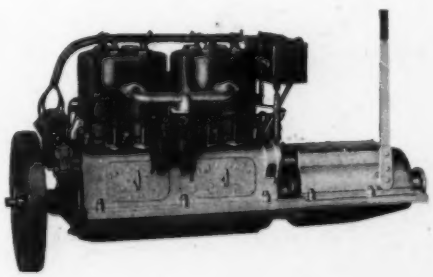
FAY & BOWEN ENGINE CO.

W. L. Fay

President

"—we have used Paragon Gears for approximately nine years—"

W. L. FAY, President.



THE FRISBIE MOTOR COMPANY
MIDDLETOWN CONNECTICUT

February 20, 1919

The Paragon Gear Works
Taunton, Mass.

Gentlemen:

Why do we use "Paragon" Reverse Gears so generally on our motors?

Because we have found the "Paragon" to be a wonderful gear, good for the strenuous service into which Frisbie valve-in-head engines go.

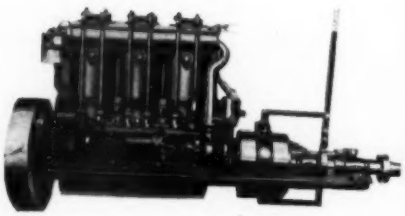
We use "Paragon" Reverse Gears for the same reason that we use the very best obtainable material and the best obtainable accessories for Frisbie Engines - because it pays us to do so.

Moreover, we use the "Paragon" Gears because they are manufactured in a large number of sizes, and are one of a few gears which will take care of our every requirement.

Yours very truly,
THE FRISBIE MOTOR COMPANY.
By K. W. Dyer Treasurer.

Frisbie VALVE-IN-HEAD MOTOR

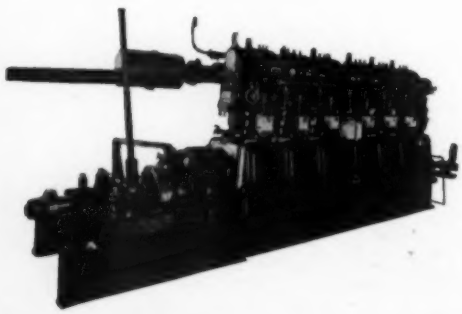
"—we have found the "Paragon" to be a wonderful gear."
K. W. DYER, Treasurer.



PARAGON

Fulton

"—we believe there is no better one made in America, ——"
J. C. SPENCER, President.



CABLE ADDRESS, FULTON, ERIE
CODE A B C 5TH EDITION

FULTON MANUFACTURING COMPANY
INTERNAL COMBUSTION ENGINES
ERIE, PENNA, U.S.A.

February 25, 1919

Paragon Gear Works
Taunton, Mass.

Gentlemen:

We have used your gear because we believe there is no better one made in America, and a Diesel engine requires the best.

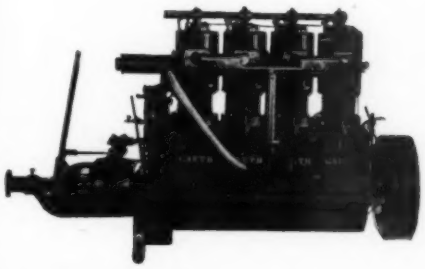
Very truly yours,
FULTON MANUFACTURING CO.
J. C. Spencer
President

Advertising Index will be found on page 140

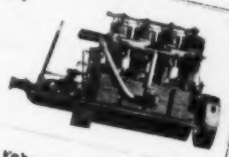
GAETH

"—because we think it is the best gear made—"

GAETH MOTOR CO.



GAETH MOTOR COMPANY
BUILDERS OF
MARINE ENGINES
2101-2117 ABBEY STREET
CLEVELAND, OHIO



February 24, 1919

Paragon Gear Works
Taunton, Mass.

Gentlemen:

In reply to your favor of February 18, would say, the reason we use your reverse gear on our marine motors is, because we think it is the best gear made and fitting reveree gear and clutch equipment for a high grade engine.

Another reason is that they have given entire satisfaction and when you tell a customer that you equipped your engine with a Paragon Gear there is no further argument.

With best wishes for continued success, we remain,

Very truly yours,

THE GAETH MOTOR COMPANY

REVERSE GEARS

J. S. GAFFGA & CO.

MANUFACTURERS OF
STATIONARY AND MARINE GAS ENGINES

Greenport, Suffolk, County, N.Y. February 24, 1919

Paragon Gear Works
Taunton
Massachusetts

Gentlemen:

We are pleased to state that Paragon Reverse Gears are standard equipment on our motor. We have used the Paragon for the past ten years and have yet to hear our first complaint. The gear is very reliable. The first cost is practically all the expense to a Paragon Gear, the up-keep being very small. No delay need be feared by those using a Paragon Gear.

Wishing you abundant and well merited success, we remain,

Very truly yours,

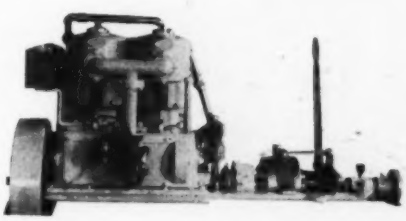
J. S. GAFFGA & CO.

GAFFGA

MARINE GAS ENGINES

"We have used the Paragon Gear for the past ten years and have yet to hear our first complaint."

J. S. GAFFGA & CO.



February 27, 1919

Paragon Gear Works
Taunton
Massachusetts

Gentlemen:

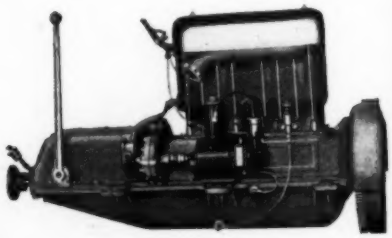
We have decided to use a Paragon Gear on our new 3-1/2 x 5 valve-in-head marine engine.

Our selection of your gear has been based entirely upon our past experience with the various types of gears on the market. The Paragon we have used extensively in connection with our various models and we are very glad to say that this gear has always proved eminently satisfactory in every respect.

Yours very truly,
GRAY MOTOR COMPANY,
A. R. Rumbles
Sales Manager

GRAY VICTORY MOTOR

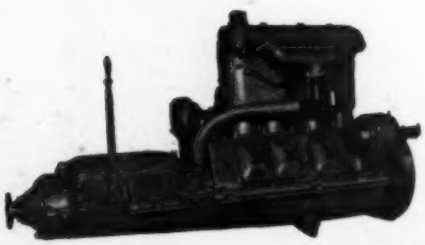
"—this gear has always proved eminently satisfactory in every respect."
A. R. RUMBLES,
Sales Manager.



PARAGON

Knox VALVE IN HEAD

"—the Paragon was the only one which satisfactorily stood this particular test."
E. J. STONE,
Asst. Engineer.



Knox MOTORS COMPANY
SPRINGFIELD, MASSACHUSETTS, U.S.A.

Feb. 20, 1919

Paragon Gear Company
Taunton
Massachusetts

Gentlemen:

In reply to your inquiry as to the particular reason for our adopting the Paragon Gear to be used in connection with the 40 H.P. Knox Marine Motor, we would say that the Paragon was selected for the reason that we wished a gear to measure up to the standard of Knox Production.

Before making our final decision, we took the various makes of gears in the open market and subjected them all to the same tests. Our finding was that the Paragon Gear showed far less wear on its shaft, bearings and gears than any other make.

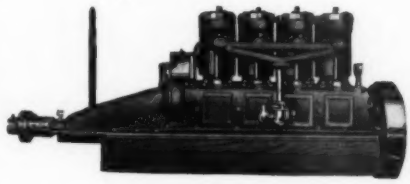
It might interest you to know that our final test consisted in putting the gear into the reverse position and running this at full throttle on the dynamometer for twenty-five minutes and the Paragon was the only one which satisfactorily stood this particular test.

Yours truly,
KNOX MOTORS COMPANY,
E. J. Stone
Asst. Engineer.

Advertising Index will be found on page 140

LATHROP
MARINE GASOLINE ENGINES

"The results obtained . . . have justified our selection."
W. H. LATHROP.



J. W. LATHROP CO.
MANUFACTURERS OF
TWO AND FOUR CYCLE
MARINE GASOLINE ENGINES

MYSTIC, CONN.

February Nineteenth
1919

Paragon Gear Works

Taunton, Mass.

Gentlemen:

We adopted the "Paragon" for reverse gear equipment several years ago, as we considered it first-class in every detail, and have since continued to use it.

Our engines are used for hard, continuous service. The results obtained from use of the Paragon Reverse Gear have justified our selection.

Respectfully yours,
J. W. LATHROP COMPANY
W. H. Lathrop

REVERSE GEARS

MIANUS MOTOR WORKS
MARINE GASOLINE ENGINES
FACTORY AND MAIN OFFICE
STAMFORD, CONN., U.S.A.

February 19, 1919

MIANUS
MARINE MOTORS

Paragon Gear Works
Taunton
Mass.

Gentlemen:

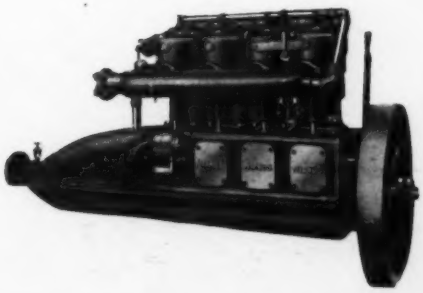
As you know we have used Paragon Reverse Gears for a good many years, and they have always given such universal satisfaction that we consider it no more than just that we should pass along to you the good word that so many of our customers have for your gear.

Their strength, durability, and freedom from the ordinary reverse gear weaknesses have always made us feel that we were adopting a safe course in equipping our motors with them.

Yours truly,

THE MIANUS MOTOR WORKS
A. L. Fairbanks
SALES MANAGER

"—we should pass along to you the good word that so many of our customers have for your gear."
A. L. FAIRBANKS,
Sales Mgr.



CABLE ADDRESS-MILLGASCO CHICAGO.

Miller Engine Co.

MANUFACTURERS OF
MARINE ENGINES
AND
PORTABLE BOAT MOTORS
2329-2331 N. TALMAN AVE.
CHICAGO

February 20, 1919

Paragon Gear Works
Taunton
Massachusetts

Gentlemen:

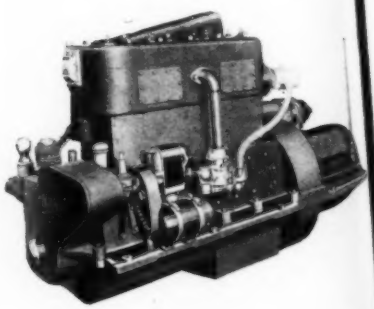
Regarding the Paragon Reverse Gear and our reasons for adopting it as standard equipment on our engines, we can only say that we have found them entirely satisfactory for our construction, and perhaps the best gear of any on the market.

Yours very truly,
MILLER ENGINE CO.
B. Villinow
Sec'y

Miller The Motor of Renown

"—entirely satisfactory for our construction and perhaps the best gear of any on the market."

B. VILLINOW,
Secretary.



PARAGON

MISSOURI ENGINE COMPANY
Gasoline and Oil Engines
2906 N. ELEVENTH STREET
ST. LOUIS, MO.

February 19, 1919

Paragon Gear Works
Taunton
Massachusetts

Gentlemen:

I believe that we have tried out most of the reverse gears on the market today, and have got the best results from your gear, so that we have adopted it as a part of our regular equipment and always furnish it with our engines except when a customer demands another gear, which is very seldom.

It is the only gear that we have found that would stand up to the work and deliver the goods. The others may last fairly well for a while but the Paragon is the only one that we can send out with the full assurance that we won't have any comebacks, and that if it is properly handled it will last as long as the engine itself.

These oil engines of ours go to almost all parts of the world, and get into the hands of men with only the most limited knowledge of machinery, and as all of them go into work boats, it is about the hardest kind of a test that could be given both the engine and the gear, and we are proud to say that both the engine and the gear have stood the test remarkably well.

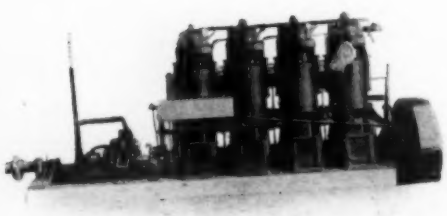
But the least part of the credit for the good work of the engines is due to the fact that the gears have done their part.

Yours very truly,
MISSOURI ENGINE COMPANY
H. Bain Treas

MISSOURI OIL ENGINE

"It is the only gear that we have found that would stand up to the work and deliver the goods."

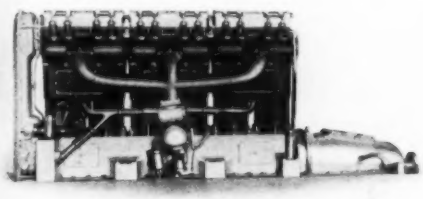
H. BAIN, Treasurer.



Advertising Index will be found on page 140

MURRAY & TREGURTHA

"—have passed very severe Government tests and have given satisfaction in every instance."
MURRAY & TREGURTHA COMPANY.



MURRAY & TREGURTHA CO.
BUILDERS OF
GASOLINE AND STEAM LAUNCHES AND ENGINES
TREGURTHA WATER TUBE BOILERS, ELECTRIC LIGHT OUTFITS
340 WEST FIRST STREET, BETWEEN E AND F STREETS

Atlantic, Mass.
March 3, 1919

Paragon Gear Works

Taunton, Mass.

Gentlemen:

In reply to your inquiry regarding the results we obtained in the use of your Paragon Reverse Gears, would state that we have been using the Paragon Reverse Gear exclusively on our 400 to 450 H.P. marine gasoline engines for some time.

These engines have been installed in our sea-sleds built for the United States Government and have passed very severe Government tests and have given satisfaction in every instance.

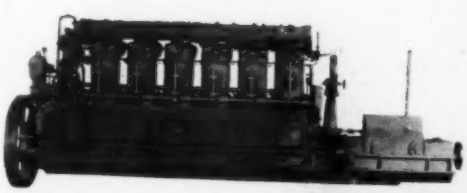
Very truly yours,
Murray & Tregurtha Co.

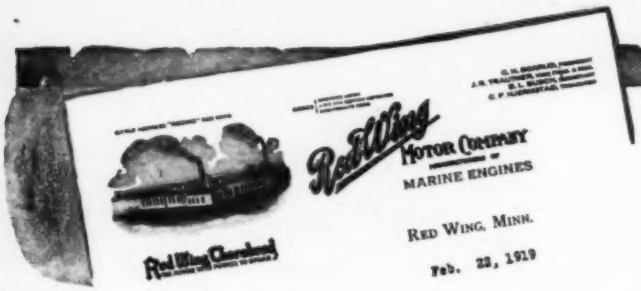
REVERSE GEARS

The Paragon Gear Works is in a splendid position to supply Reverse Gears for Heavy Oil Engines and Diesel Engines. We make a specialty of designing and building Heavy Duty Gears for this Service. Our Engineers will gladly co-operate with manufacturers in working out the details of a Reverse Gear to suit their individual requirements.

"NELSECO"
Diesel Engines

Engine builders are invited to avail themselves of the services of Paragon engineers for the solution of any special reverse gear problem.





Red Wing Motor Company
MARINE ENGINES

RED WING, MINN.

Feb. 22, 1919

Paragon Gear Works
Taunton, Massachusetts

Gentlemen:-

The Paragon Reverse Gear has been used on Red Wing THOROBRED Engines for a period of about ten years. Paragon gears have given most excellent service and satisfaction to users of THOROBRED Engines equipped with same.

Paragon equipped THOROBRED Engines are in use in nearly every country on earth.

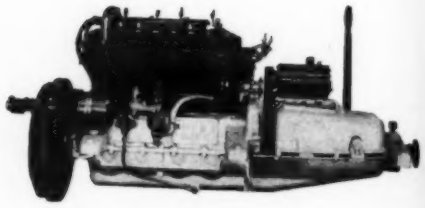
Yours very truly,

RED WING MOTOR COMPANY
J. R. Trautner Mgr.

Red Wing Thorobred
THE MOTOR WITH POWER TO SPARE

"Paragon Gears have given most excellent service and satisfaction."

J. R. TRAUTNER,
Manager.



PARAGON

THE REMINGTON OIL ENGINE COMPANY
BUILDERS OF
STATIONARY AND MARINE OIL ENGINES

REMINGTON OIL ENGINE

"—we find them very efficient, reliable and in fact just the gear for engines of our type."

E. V. RICE, Secretary.

Stamford, Conn.
February 21, 1919

The Paragon Gear Works
Taunton
Massachusetts

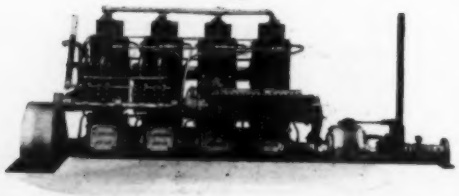
Gentlemen:

We are writing to inform you that we have been using "Paragon" gears since first going into business and find them very efficient, reliable and in fact just the gear for engines of our type.

Trusting that we shall have the pleasure of continuing our pleasant relationship, we are,

Very truly yours,

THE REMINGTON OIL ENGINE CO.
E. V. Rice
Secretary

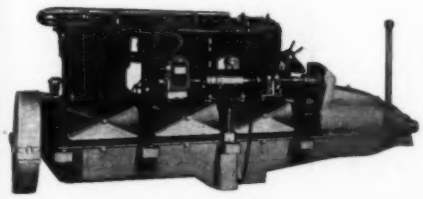


Advertising Index will be found on page 140

Scripps

"After ten years continuous use of the Paragon gear we consider it the best obtainable—"

A. J. DOWNEY,
Vice-Pres. & Gen. Mgr.



SCRIPPS MOTOR CO

COMPLETE MARINE POWER PLANTS

DETROIT, MICH.

Paragon Gear Works
Taunton
Mass.

February 21, 1919

Gentlemen:-

We are enclosing photos of our new post-war models - our four cylinder Model D-4 and our new six cylinder Model D-6 for your files.

It has always been Scripps policy to adopt as standard equipment the very best obtainable on the market.

After ten years continuous use of the Paragon gear we consider it the best obtainable and are continuing the use of it in our new models.

Yours very truly,

SCRIPPS MOTOR COMPANY

A. J. Downey

Vice Pres. & Gen. Mgr.

REVERSE GEARS

Factory at Faunce, Mass. Cable Address, "Stanley" Boston

OFFICE OF
THE STANLEY COMPANY,
MAKERS OF THE
STANLEY GASOLINE ENGINES.
Post Office Square Building, 70 Milk Street,
Boston, Mass., U. S. A.

March 3, 1919

The Paragon Gear Works
Taunton
Massachusetts

Gentlemen:

Our reason for adopting the Paragon Gear was that we found it a very serviceable gear, reasonable in price, and not at all likely to become deranged and damaged.

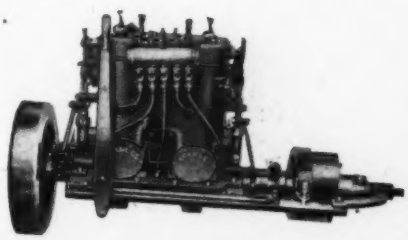
We have used it exclusively for a number of years past and it has always given us the very best of satisfaction.

Very truly yours,
THE STANLEY COMPANY
By
F. F. Stanley

STANLEY GASOLINE ENGINES

"—reasonable in price, and not at all likely to become deranged and damaged."

F. F. STANLEY.



THE TORRINGTON COMPANY, STANDARD PLANT
SUCCESSOR TO
THE STANDARD COMPANY.
MARINE ENGINE DEPARTMENT.

THE MATCHLESS "EAGLE" AT A MATCHLESS PRICE

TORRINGTON, CONN.

Feb. 21, 1919

Paragon Gear Works
Taunton, Mass.

Gentlemen:-

Eagle engines have always had the highest grade equipment - that's the reason for using Paragon Reverse Gears exclusively.

Very truly yours,

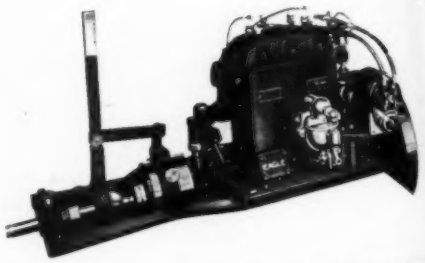
THE TORRINGTON COMPANY
STANDARD PLANT

Dictated by:
Hamman

THE MATCHLESS
"EAGLE"

"—that's the reason for using Paragon Reverse Gears exclusively."

GEO. HAMMAN.



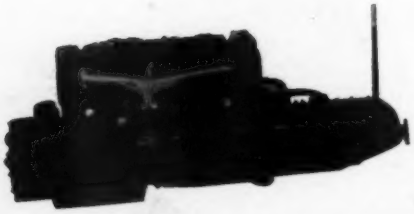
PARAGON

VAN BLERCK

THE STANDARD HIGH SPEED MOTOR

"—during the past six years we have not been confronted with any situation that seemed to make a change desirable."

F. B. SEXTON,
Sales Manager.



VAN BLERCK MOTOR CO.
30 CHURCH STREET
New York

Executive & General Sales Offices NEW YORK Branches BOSTON, MASS. WASHINGTON, D.C. Factory MONROE, MICH.

Manufacturers of INTERNAL COMBUSTION ENGINES

February 19, 1919

Paragon Gear Works
Taunton
Massachusetts

Gentlemen:-

Those accessories which are built into and thereby become an integral part of Van Blerck motors, naturally have been selected only after a comparison of the records of competitive tests.

It was upon this basis that your reverse gear was first adopted as standard equipment for our product, and during the past six years, we have not been confronted with any situation that seemed to make a change desirable.

Yours very truly,

VAN BLERCK MOTOR COMPANY

F. B. Sexton

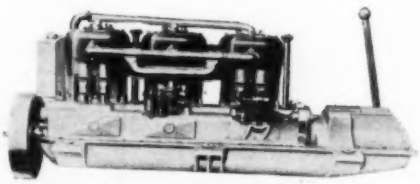
Sales Manager

Advertising Index will be found on page 140

Wisconsin

"We have found your gear the most reliable on the market,——"

CHAS. H. JOHN,
President & Treasurer.



WISCONSIN MOTOR MANUFACTURING CO.
MANUFACTURERS OF
Wisconsin AUTOMOBILE, TRUCK AND MARINE MOTORS
ENGINEERS AND AUTOMOBILE SPECIALISTS

Milwaukee, Wis. Feb. 21, 1919.

Paragon Gear Works,
Taunton, Mass.

Gentlmen:-

We are mailing you under separate cover a photo of one of our marine engines using your gear.

We have found your gear the most reliable on the market, the workmanship and materials used are excellent and they stand up very well in service. Our customers all seem to be pleased with them.

Very truly yours,

WISCONSIN MOTOR MFG. CO.

Chas. H. John
President & Treasurer.

REVERSE GEARS

THE WRIGHT MACHINE COMPANY
INCORPORATED
OWENSBORO, KENTUCKY
U.S.A.
MANUFACTURERS OF
MARINE & STATIONARY GAS AND OIL ENGINES

February 20, 1919

Paragon Gear Works
Taunton, Mass.

Gentlemen:

In reply to your letter of the 18 in regard to our new Wright engine, will say that while we have lately perfected this engine, still it has been in use for several years.

The particular reason we have adopted the Paragon Gear is that we have had quite a number of inquiries for our engines to be equipped with this gear. We have also convinced ourselves that this is practical and will show good results.

very truly yours,

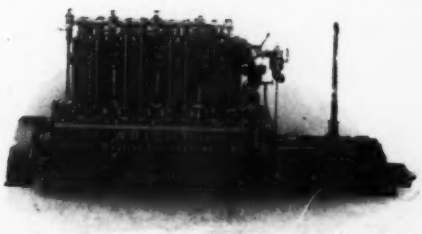
THE WRIGHT MACHINE COMPANY

Ely Cain
Secretary

WRIGHT
HEAVY DUTY ENGINES

"—we have adopted the Paragon Gear because we have had quite a number of inquiries for it—"

E. G. CAIN, Secretary.



The Care of PARAGON GEARS

THE Paragon Reverse Gear is a simple piece of mechanism, particularly easy to keep in adjustment, and can be readily gotten at for inspection. If it is correctly installed, kept properly lubricated and adjusted, it will give perfect service under all conditions.

HOW TO ADJUST YOUR GEAR

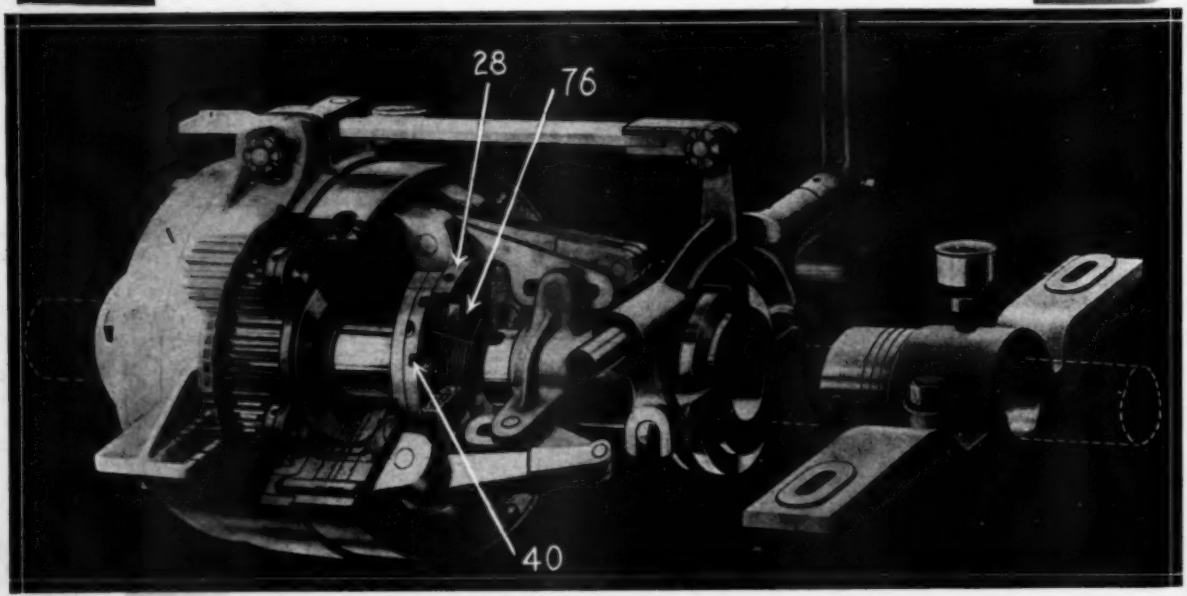
If the clutch slips, back out the set screw (76) and turn the screw collar (28) to the **right** until the set screw (76) is opposite the next slot in the brass check collar (40). Then set up the screw (76) so that the end of it will come in the slot. Repeat this operation if necessary until the clutch will engage smoothly and carry the full load without slipping.

The neutral position is when the operating lever is vertical. The reverse drive is obtained by means of the brake band, which clamps around the case and keeps it from revolving. The brake band is operated by throwing the lever back as far as possible. Should the case turn when the lever is in this position, remove the cotter pin from the bolt at the top of the brake band and turn the bolt to the **right** until the case ceases to revolve, keeping the lever thrown back as far as possible. When this is adjusted, replace the cotter pin.

Take care of your Paragon Reverse Gear, adjust it when necessary, keep it lubricated and it will render you maximum service.

PARAGON GEAR WORKS

CUSHMAN STREET TAUNTON MASS.



Advertising Index will be found on page 140

THE SMOKED GLASS

Soot on the smoked glass is nothing more nor less than the much-talked-of "carbon deposit" found in the cylinders of the motor boat engine.

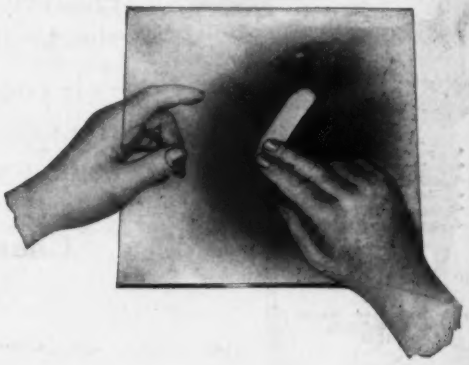
Even the proper use of any petroleum oil as a lubricant is bound to leave more or less carbon in the combustion chamber and the excessive use, which often happens, increases the deposit.

If no other ingredient but carbon were deposited, much of the carbon trouble might be eliminated, but some oils, notably those manufactured from a paraffine base crude, deposit, also, a gummy, sticky substance in the combustion chamber which collects the free carbon, holding it for the action of the excessive heat —this heat forms a cement which hardens into the scales usually found after a long cruise.

EASILY RUBBED OFF

The soot on the glass is easily rubbed off with the fingers, and so may the soot or carbon in the cylinders generated from asphalt-base oils be easily rubbed off or blown out with the exhaust.

Consequently, a lubricating oil which is manufactured from Southern asphalt-base crude, containing no paraffine, must necessarily leave less carbon in the chamber, as it contains no gummy, sticky substance to cement the free carbon.



THE ANSWER IS OBVIOUS

Use an oil that is free from paraffine—less carbon and MORE POWER is the greatly desired result.

When we say there is more power in SUPREME AUTO OIL we mean there is less carbon deposited, for the reason that this sterling product is manufactured from Southern asphalt-base crude oil containing no paraffine to gum and stick.

Neither is there any foreign substance in SUPREME AUTO OIL that might prevent the most efficient lubrication of any engine, be it of four, six, eight or twelve cylinders.

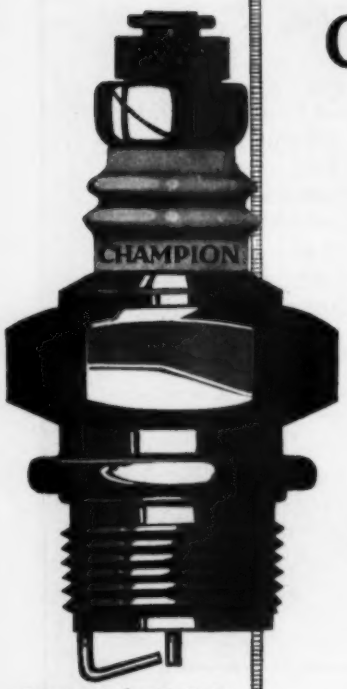
GULF REFINING COMPANY

General Sales Offices: Pittsburgh, Pa., U. S. A.

District Sales Offices:

New York, Philadelphia, Boston, Atlanta, New Orleans, Houston

Champion
Dependable Spark Plugs



Champion Truck and Marine Plug. J. A. 8.-45-7/8-18. Price, $1.25

Chosen for Dependability

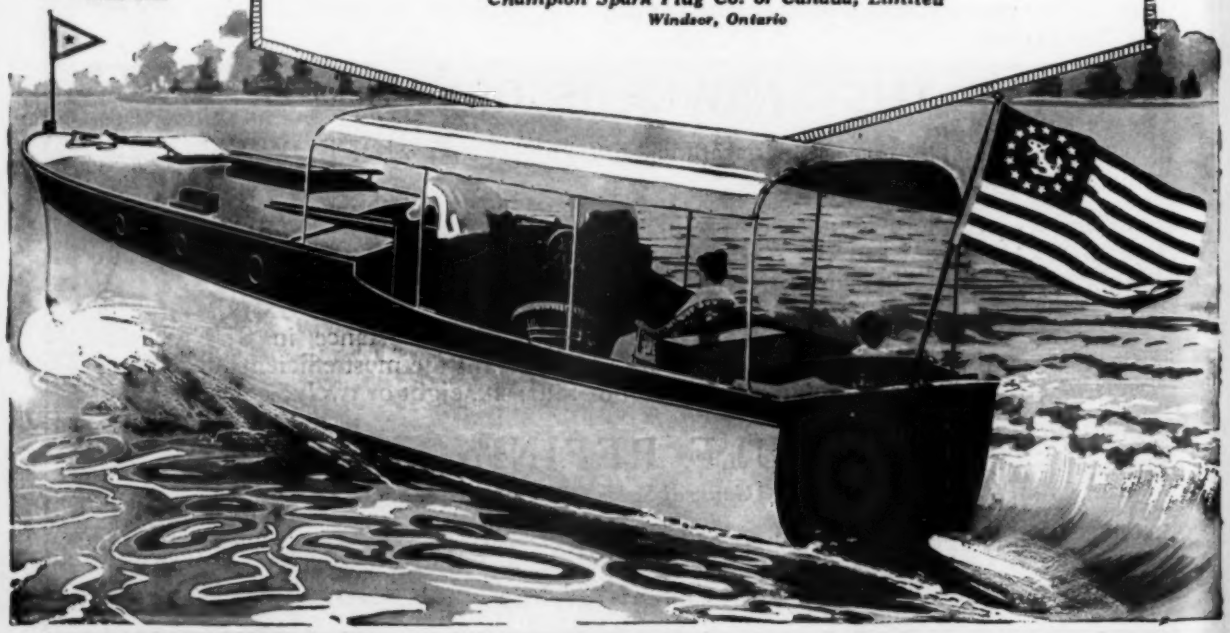
Motor Boat owners always feel greater assurance when using Champion Spark Plugs. An ever increasing number always make sure to look for the name "Champion" on the box as well as on the porcelain.

Exhaustive laboratory tests have shown conclusively that these plugs will withstand severe shocks and vibration, heat and cold.

If you are not already deriving the benefits from the use of these dependable spark plugs, begin today and notice the difference.

Champion Spark Plug Company
Toledo, Ohio

Champion Spark Plug Co. of Canada, Limited
Windsor, Ontario



Advertising Index will be found on page 140

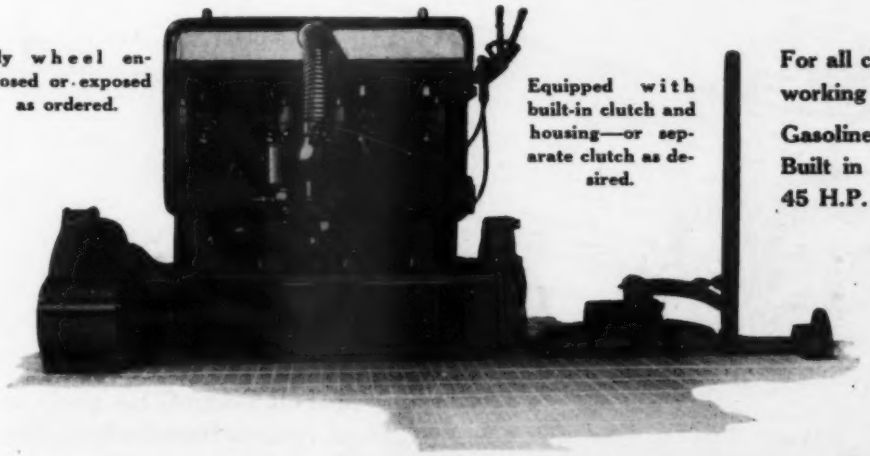
A NEW GRAY

This is the day of low grade, but very high priced gasoline engine fuel

THE engine to economically and efficiently use this fuel must be designed especially for that purpose. The conditions are entirely different. It is not surprising that an engine designed to use high grade volatile gasoline of a few years ago balks and refuses to function properly with the "stuff" you buy today under the name of gasoline. Nevertheless, this low grade fuel can be used just as satisfactorily as the old fuel, *if your engine is designed for it.*

Recognizing this condition, we have designed a brand new GRAY to take advantage, not only of every new engineering idea adaptable to a marine motor, but to produce an engine that will consume the present low grade fuel—even kerosene oil, just as efficiently and just as satisfactorily, we think, even better than the best engines have ever consumed the best gasoline.

Write and let us tell you all about this wonderful motor. Its bronze back-bearings; its wonderful speed control; its splendid oiling system—force-feed to the main-bearings. The fact that it cannot back-fire, and set your boat on fire. That you can have our standard built-in clutch and housing—or separate clutch as you wish. That the entire fly-wheel can be enclosed or not, as you prefer. That it will take a number of standard starters *without any special equipment or expense.* That it is an overhead valve motor, and sold to you at a price that no other high grade motor has ever been offered at.



Fly wheel enclosed or exposed as ordered.

Equipped with built-in clutch and housing—or separate clutch as desired.

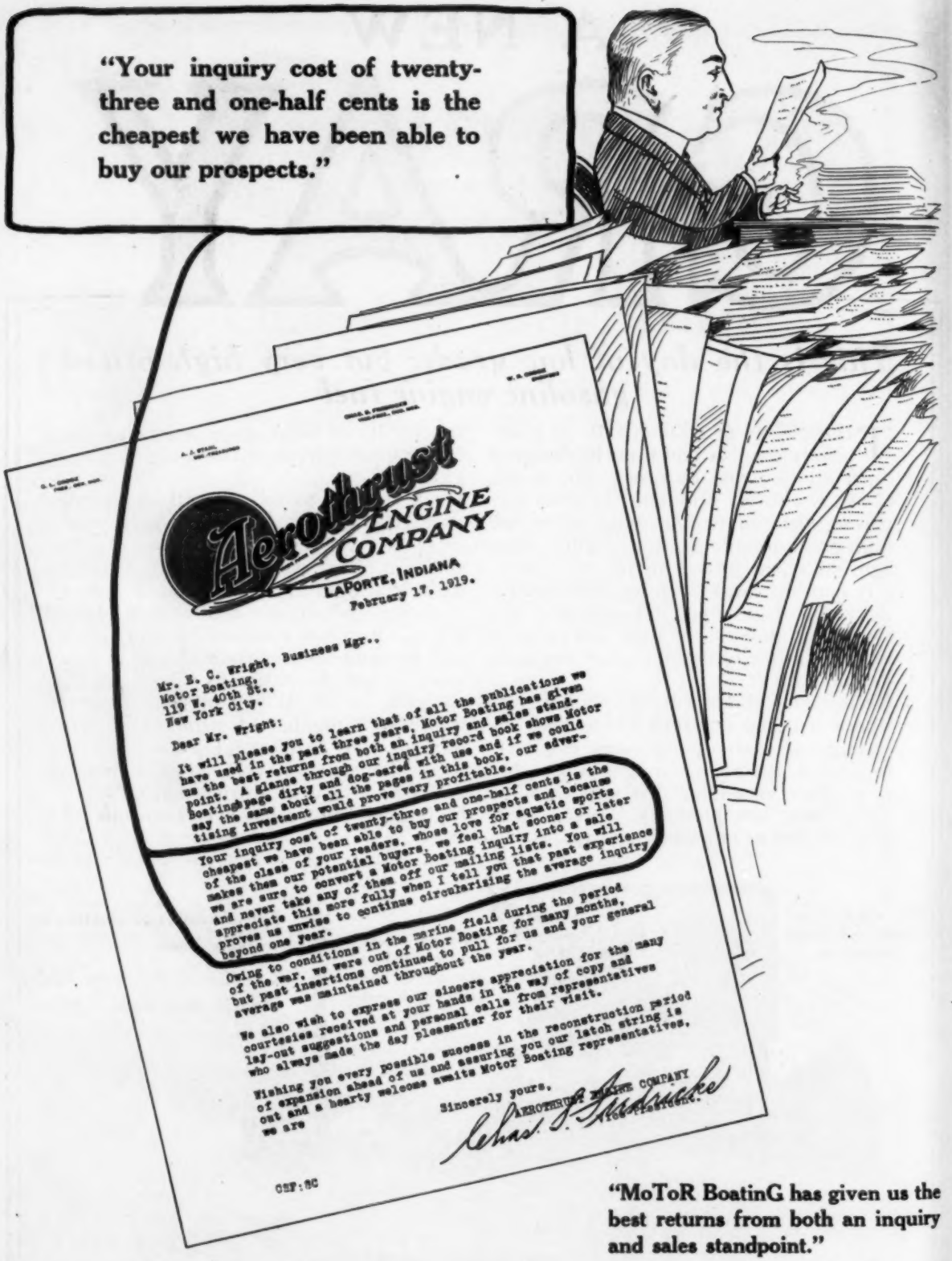
For all classes of pleasure or working boats.

Gasoline or Kerosene Fuel. Built in three sizes — 20 to 45 H.P.

Ask for Circular A describing this motor.

Gray Motor Co., 2106 Mack Ave., Detroit, Mich.

Gray 2 Cycle Motors are Standard the World Over.

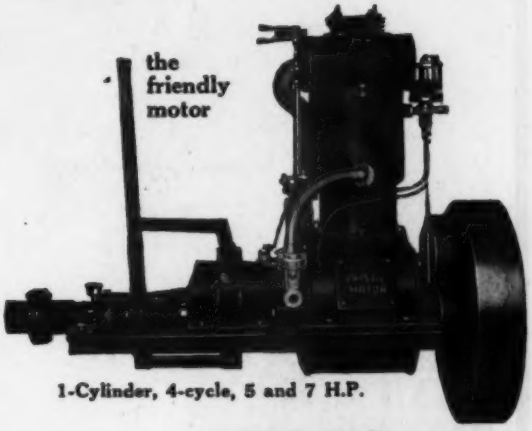

"Your inquiry cost of twenty-three and one-half cents is the cheapest we have been able to buy our prospects."
Aerothrust ENGINE COMPANY
LAPORTE, INDIANA
February 17, 1919.
Mr. E. C. Wright, Business Mgr.,
Motor Boating,
119 W. 40th St.,
New York City.
Dear Mr. Wright:
It will please you to learn that of all the publications we have used in the past three years, Motor Boating has given us the best returns from both an inquiry and sales standpoint. A glance through our inquiry record book shows Motor Boating page dirty and dog-eared with use and if we could say the same about all the pages in this book, our advertising investment would prove very profitable.
Your inquiry cost of twenty-three and one-half cents is the cheapest we have been able to buy our prospects and because of the class of your readers, whose love for aquatic sports makes them our potential buyers, we feel that sooner or later we are sure to convert a Motor Boating inquiry into a sale and never take any of them off our mailing lists. You will appreciate this more fully when I tell you that past experience proves us unwise to continue circularising the average inquiry beyond one year.
Owing to conditions in the marine field during the period of the war, we were out of Motor Boating for many months, but past insertions continued to pull for us and your general average was maintained throughout the year.
We also wish to express our sincere appreciation for the many courtesies received at your hands in the way of copy and lay-out suggestions and personal calls from representatives who always made the day pleasanter for their visit.
Wishing you every possible success in the reconstruction period of expansion ahead of us and assuring you our latch string is out and a hearty welcome awaits Motor Boating representatives, we are
Sincerely yours,
AEROTHRUST ENGINE COMPANY
Chas. F. Fredricks
Vice-President.
CFF:BC
"MoToR BoatinG has given us the best returns from both an inquiry and sales standpoint."

MoToR BoatinG Will Do This For You!

Advertising Index will be found on page 140

Frisbie an' I

—we'll help you to make this a PROFITABLE YEAR

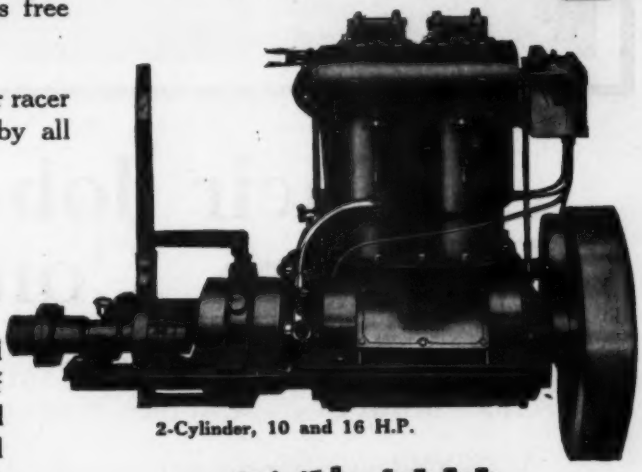


1-Cylinder, 4-cycle, 5 and 7 H.P.

BIG season ahead? Get set for it, **right.** That old motor—you know, the one you've always threatened to scrap or sell to some "friend" —get rid of it now, "in the dark of the night," as the novelists say. Then install a fine, new Frisbie and go through this and succeeding seasons free from care, on a paying basis.

For fishing boat, gravel scow, dory, cruiser, or racer —for all medium-duty work or pleasure, by all means, get a

Frisbie VALVE-IN-HEAD MOTOR



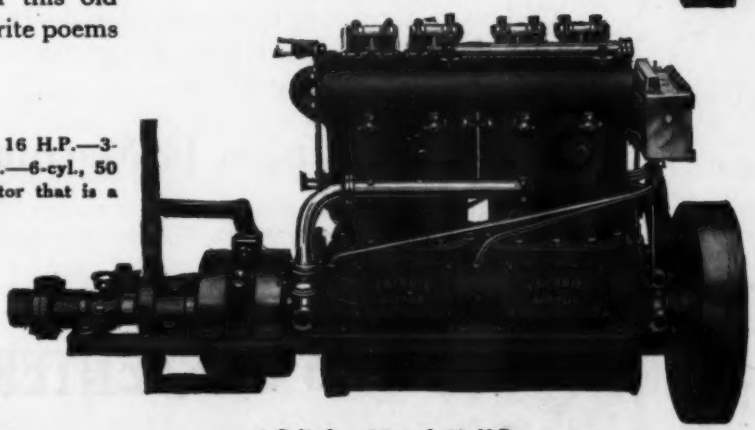
2-Cylinder, 10 and 16 H.P.

Its low fuel bills, negligible repair cost and great constancy will be the big surprise of your life. Great numbers of pleasure and work boaters in all the waters of this old U. S. A. own Frisbies and almost write poems about them.

Made in 5 to 75 H.P.

1-cyl., 5 and 7 H.P., 4-cycle—2-cyl., 10 and 16 H.P.—3-cyl., 18 and 25 H.P.—4-cyl., 30 and 40 H.P.—6-cyl., 50 and 75 H.P. Also a Kerosene Burning Motor that is a genuine success.

Send for Latest Literature



4-Cylinder, 30 and 40 H.P.

THE FRISBIE MOTOR CO.
7 College St. Middletown, Conn.

Their Job is Done They're Coming Back!

The Sailors and Soldiers of 1917-19 are going to be the Yachtsmen of 1919,—more of them than ever before.

Old boats are going to be remodeled—new boats are going to be built,—old Yachtsmen and new are going to combine to make 1919 stand out big in yachting history.

Our Business Is Marine Supplies

If you are one of those who believe in *preparedness* you will send *now* for our big catalog and lay your course for the Big Season ahead.

GEO·B·CARPENTER & CO.

200 W. Austin Avenue **Chicago, Ill.**

Advertising Index will be found on page 140

"Liberty" Swimming Belts
(Bailey's Patent)
$2.00
From your Dealer or by mail, postpaid

Life Preserver Specialists

Masten Life Jacket
(Bailey Type)

The law requires you to carry a life preserver for every passenger on your boat. You must have them. Why not equip your boat with something beside the old style cumbersome one-purpose cork belts which are only in the way 99% of the time.

We are Life Preserver Specialists. We make many types of preservers which combine not only safety in emergencies with practicability and convenience but are also designed for real utility under many conditions.

Practically all Masten Life Preservers are approved by the Government and thousands of them were used on transports and naval vessels during the war. Satisfaction guaranteed or money refunded on any type.

Masten Life Preserver Jackets

Our regular jacket preserver is also useful and comfortable to wear as a reefer for navigating in cold or wet weather. Will keep you afloat indefinitely. Large collar has sufficient buoyancy to float the head well above the water even should the wearer be unconscious. All sizes—for men, women and children.

"Liberty" Swimming Belt

Learn to swim in half an hour with a Liberty Swimming Belt. It sustains your weight so all you need do is to make the strokes. Nothing to impede freedom of movements. Insures safety in the water for women and children. Adds to pleasure for those who can swim. Every motor boat, every summer cottage and vacation camp should have several "Liberty" Swimming Belts.

Universal Safety Suit

Bailey Type Masten Jacket

Our new Bailey-type is a patented design jacket which is both adjustable and reversible. Any way you put it on is the right way—no delay in emergencies. Fits any size person—man, woman or child. Simplest, most practical and fool proof life preserver ever devised.

Universal Safety Suit

The most practical life suit on the market today—proved by competitive tests. Keeps you *safe, dry, warm* and *comfortable,* no matter how long you are in the water. Invaluable for navigating officers, hunters, fishermen, Arctic explorers, prospectors, etc. Ideal for underwater work about a motor boat. Made of soft, pliable rubberized material, either single or double texture, with or without weighted soles.

Masten Life Preserver Cushions and also Masten "Roll-up" Life Preservers are especially popular on smaller motor boats.

We also manufacture Motor Boat Tops, Spray Hoods, Life Rafts, etc.
Write today for new illustrated catalog - free

Motor Boats, Engines, Marine Accessories and Supplies

including a full line of Masten Products on display at our show rooms, Booth 4, Concourse, Hudson Terminal Bldg., 30-50 Church St., New York City. Stop and see this display before you buy your equipment this spring.

Address mail inquiries to
G. H. MASTEN CO., Inc.
222-224 East 46th Street,
New York Phones: Vanderbilt 4258-9

Every Day Enjoyable

THE glass enclosed Bridge Deck of the Albany fifty-foot Standardized Cruiser is the center from which life aboard radiates—open to the breeze on sunny days—glass enclosed on cold or rainy days—a glorious lounging place in which the scenery and exhilaration of a cruise may be enjoyed at all times. As a dining saloon its pleasant appearance is equaled by its convenience —accessibility to galley, and a beautiful buffet and china closet aft.

The deckhouse is but one of the many delightful features of this boat. The owner's cabin is very large and handsome—there is a nice stateroom for guests—comfortable quarters for the crew—well-lighted, accessible engine room and a thoroughly practical galley with three-hole range (including oven and shelf). The utilization of space is remarkable.

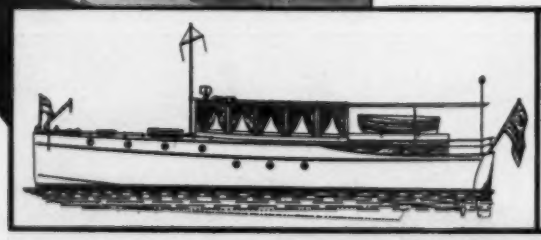
Add to these conveniences grace of line, speed and seaworthiness, and you have the craft that has been justly termed

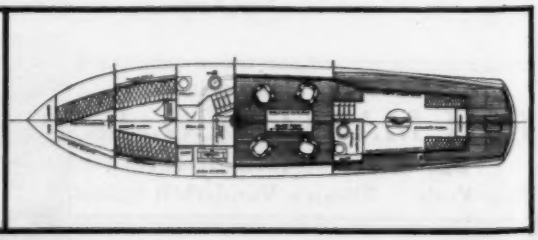
The Biggest Little Ship Afloat

This fifty-foot Cruiser has some little sisterships—26, 30 and 35-foot Runabouts, and 36- and 40-foot Cruisers. We do not issue a general catalog, but compile bulletins, plans, specifications, etc., for each boat separately, giving maximum information. When you write please state which type and size of boat you are interested in.

ALBANY BOAT CORPORATION

Seventh Street, Watervliet, N. Y.





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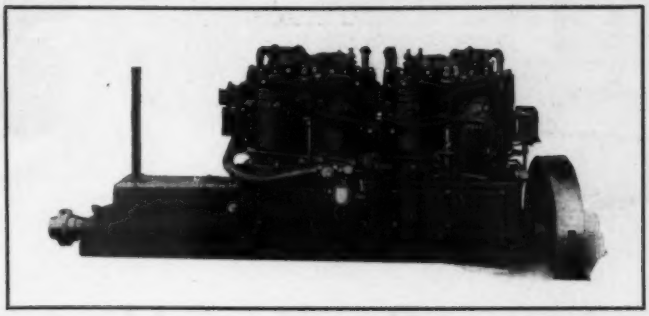
ANNOUNCING NEW 4 CYL. MODELS



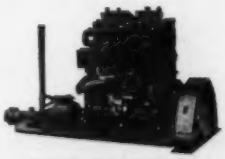
HONEST-CLAY WORK ENGINES

We take pleasure in announcing a new 4-Cylinder Model for heavy work boat requirements, built in 25, 35, 59, and 80-100 H.P. sizes.

This new model is, in reality, an extension of the single and double cylinder Honest Clay Engine line which has been built for the past 22 years. These four cylinder engines have built into them all of the reliability, and slow speed, hard work ability, that has made our double cylinder models so popular among fishermen and workboat-men. They have the same bore and stroke as the two-cylinder machines, are extremely well balanced and practically free from vibration, and, in so far as fundamental factors are concerned, there is nothing experimental or untried in their construction. However, in addition to improvements recently made in our one and two cylinder machines, these models have a number of refinements which have not as yet been announced. Full particulars will be furnished all interested parties on request.

Be sure you are getting the best engine for your boat—if it requires a rugged, slow speed, heavy duty engine, which will run under heavy load for long periods of time, with little attention and no trouble, it will pay you to investigate these models.

SINGLE CYLINDER MODEL
Built in 6, 8, and 10 H. P. Sizes



DOUBLE CYLINDER MODEL
Built in 12-14; 16-18; 20-22; 40-50 H. P. Sizes

THE CLAY ENGINE MFG. CO.

664 EAST 72 STREET CLEVELAND, OHIO, U. S. A.

DISTRIBUTORS

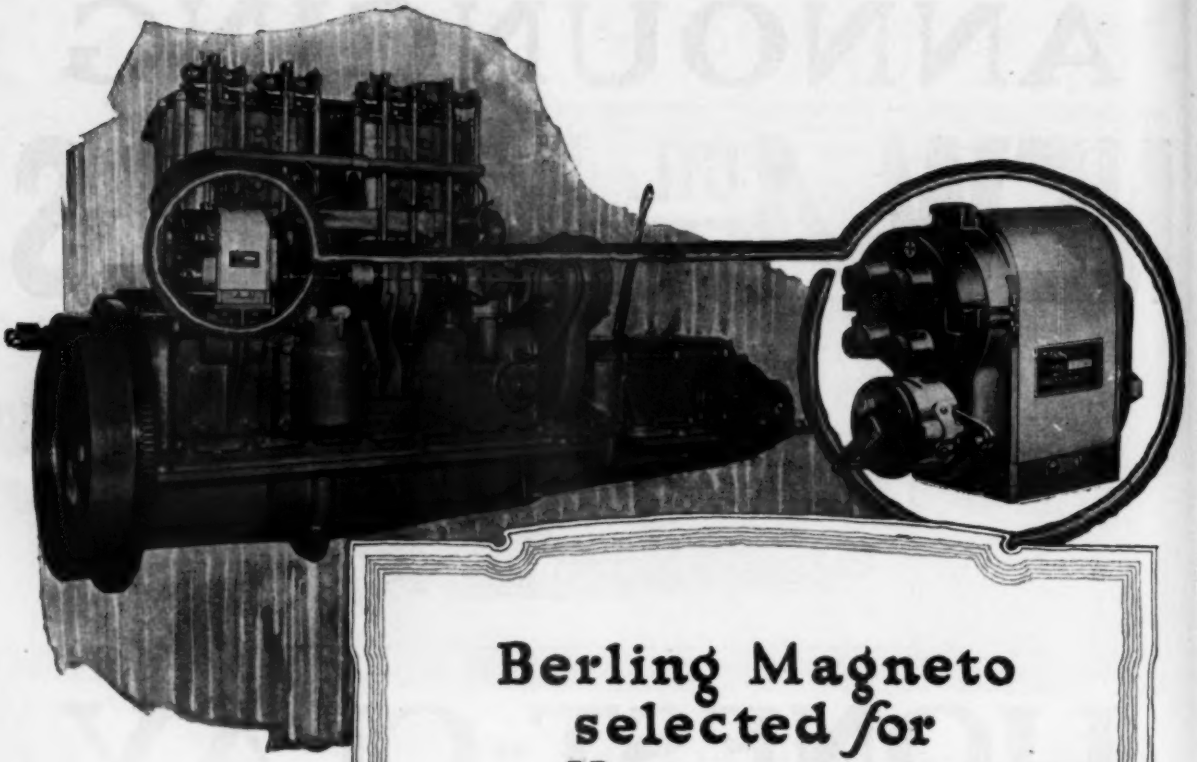
NEW YORK—Sutter Bros.
BOSTON—Walter H. Moreton
PHILADELPHIA—W. E. Gouchenaur Mfg. Co.
SEATTLE—Pacific Marine Engine Co.
PORTLAND, ORE.—F. G. Epton
NEW ORLEANS—Arthur Duvic

RETURN THIS COUPON FOR FULL INFORMATION REGARDING NEW 4-CYLINDER MODEL

Clay Engine Mfg. Co.—Please send me information regarding your new 4-cylinder model.

I am interested in an engine as follows.....

Name .....Address .....



Berling Magneto selected for Knox motors

The Berling Magneto has been adopted by the Knox Motor Associates, of Springfield, Mass.

This adds another lustrous name to the list of marine-motor manufacturers who have selected the Berling.

In every branch of the automotive field, the Berling Magneto sparks the recognized leaders.

ERICSSON MANUFACTURING COMPANY

BUFFALO, N. Y.

In the great war—more American airplanes were sparked by Berlings than by any other ignition.

Berling Magneto

WORTH MORE DOES MORE

Advertising Index will be found on page 140

Stays White Longer Keeps Clean Easier

Columbia Yacht White is a *permanent* white marine finish. You can wash its wear-resisting surface with soap and water. It spreads so well you use less paint. Saves time and labor because it flows evenly and works freely under the brush. Its whitest whiteness defies salt water and hard knocks. No mid-season painting is needed. Next year its smooth, clean surface may be economically refinished. In lasting beauty Columba Yacht White (semi-gloss) is a fair sample of all

DEVOE *MARINE PAINTS*

Vernosite, the long-life spar varnish, cannot turn white or lose gloss under sun, rain, snow, sleet or salt water.

Devoe Deck Paint outwears wear, water and weather. Stands extreme sun heat and will not crack, peel or chip. Six durable colors.

Heat-resisting Enamel gives a high, oil-proof, heat-proof gloss to marine engines that keeps them clean, bright and rust-free. Easy to apply, hard to chip off. Six rich colors.

At paint, hardware and ship supply dealers

DEVOE

The oldest paint manufacturing concern in the United States. Founded in New York, 1754

DEVOE & RAYNOLDS CO., INC.
NEW YORK - . CHICAGO

Booklet Ahoy!

Write for "How to Paint a Boat." Full of practical information on painting any part of any vessel. Sent free with sample panels finished with Columbia Yacht White (semi-glass) and with Vernosite (long-life spar varnish). Please mention your dealer's name.

Michigan Propeller Wheels

Install a Michigan Propeller Before the Season Opens

Are you sure you have the right propeller? Don't forget that the amount of power you derive from your engine does not do all of its work unless the business end of your boat is equipped with the proper propeller. So many are apt to forget the importance of correct propeller equipment that it is little wonder that some people are continually complaining about the efficiency of the power plant. Before your boat goes into the water this spring be sure that you have installed a propeller that will give maximum satisfaction at all times under all conditions.

The way to safeguard yourself is to install the ever reliable Michigan. It is the oldest propeller on the market and is used on over fifty percent of the boats in the water today. We have established a world-wide reputation for correctness of design and pitch—two of the most important factors in modern propeller construction.

Michigan Speed Propeller Wheels are selected for most boats because experienced boatmen are familiar with their record of consistent satisfaction. Michigan service means not only the delivery to you of a propeller that is unexcelled—it means the delivery of your propeller on time. We will be glad to give you complete information at any time.

Send for our big catalog at once

MICHIGAN WHEEL COMPANY

C. J. Litscher, President

UNIVERSAL JOINTS, COUPLINGS, THRUST AND STERN BEARINGS
BALL RACES, POWER BILGE PUMPS, MOTOR ACCESSORIES

GRAND RAPIDS 1240 Monroe Ave. MICHIGAN

Michigan Three Blades Reversible Propeller Wheel

Those who use the one-way motor boat are the first to realize the advantages of the reversing propeller. Every advantage of the reverse gear yet it takes up no room in the boat. It increases the factor of safety in boating and saves time and trouble in many ways.

Boat Owners and Dealers: You will find our line most complete. Every article listed in our catalog has stood the test of time.

Michigan Weedless Speed Propeller Wheel

This wheel will be appreciated by others who navigate shallow waters filled with weeds. This propeller opens up to many boatmen countless lakes and ponds that would be impassable. It is easily attached to any shaft and with the addition of a weedless rudder increases boating possibilities in a large measure.

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COMFORTABLE

RUNABOUTS

SPEEDY

CLASSY

21 Feet to 40 Feet

Bulletins and Catalog Sent on Request

All Powered With the Celebrated Fay & Bowen Four Cycle Engines

FAY & BOWEN ENGINE COMPANY

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Wyman-Gordon Crankshafts

are properly designed and balanced. They are accurately marked for machining, which is a distinct saving to the manufacturer, made from selected steel and properly heat-treated.

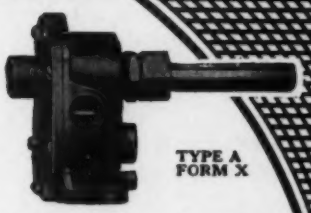
Add to all this our Dependable Service, and you realize what "GUARANTEED FORGINGS" mean to the Engine Builder.

WYMAN-GORDON COMPANY

"The Crankshaft Makers"

WORCESTER, MASS. **CLEVELAND, OHIO**

The
Oberdorfer Pump



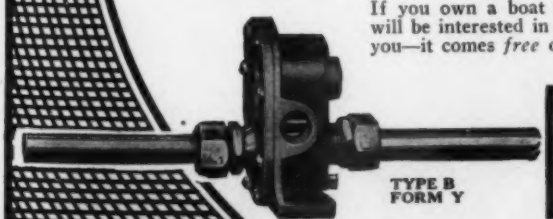
TYPE A
FORM X

Lubrication is recognized as one of the most important phases of internal combustion engine functions. The cooling system is probably second in importance. The finest power plant made will not operate properly if it is equipped with an inferior pump whether it supplies water, fuel or oil. And yet many experienced boatmen fail to realize the importance of a good pump for marine use.

OBERDORFER BRONZE GEARED PUMPS

are built especially for marine use—they are made to withstand the brutal punishment encountered in use on board boat—*Oberdorfer Bronze Geared Pumps* are noiseless, automatic, compact and reliable. The supply of water, fuel or oil is governed entirely by the motor—*there is never an over or under supply.* If you have ever had trouble with your pump you will find a world of satisfaction in the trouble-proof Oberdorfer.

If you own a boat powered with an internal combustion engine you will be interested in our new book on pumps. Your copy is ready for you—it comes *free* on your request.



TYPE B
FORM Y

M. L. OBERDORFER BRASS CO.
812 E. Water St.
Syracuse **New York**

THE after effects of Goblin Soap are delightful! The skin is not only thoroughly cleaned, but is left soft and healthy.

Especially good for children whose tender skin needs the greatest care.

Goblin Soap
WORKS WONDERS

For office, home, workshop, garage; for every place, where thorough, wholesome cleanliness is desired and where economy is appreciated.

If your dealer does not have Goblin Soap, please send us his name and we will see that you are promptly supplied

CUDAHY, 111 W. Monroe St., Chicago
64 Macauley Avenue, Toronto, Canada

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